


HOME GEOGRAPHY FOR PRIMARY GRADES



HAROLD W. FAIRBANKS

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HOME GEOGRAPHY

By

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Author of "Stories of Mother Earth," etc.



REVISED EDITION



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CONTENTS

	PAGE
The Earth Upon Which We Live	11
The Soil	15
How the Soil is Made	18
What Plants Need	25
The Seasons	29
How the Seasons Affect Plants and Animals	37
Three Forms of Water	41
Where the Water Comes From	47
The Wind	54
The Clouds	57
Springs	65
Everything has Weight	69
Water Works for Us	73
The Surface of the Land	78
The Ocean	83
The Work of the Ocean	88
How the River Made the Valley	91
The Summer Stream	98
What is Climate?	103
What We Learned by Climbing a Mountain	107
Story of a Mountain	115
Something about Lakes	120
What Rocks are Made of	124
Where Minerals are Found	129
The Inhabitants of the Water	136
The Sprouting Seed	141
Where Flowers Grow	144

	PAGE
Some Common Trees	151
Something about the Birds	155
Something about the Wild Animals	160
Homes of the Wild Creatures	167
Our Homes	173
How People Used to Travel	182
How We Travel Today	191
Occupations	204
Trade and Commerce	208
Hunting and Fishing	211
Farming	217
Stock Raising	221
Lumbering	227
The Country Store	234
Something about a City	237
The Making of Sugar	241
What the Cow Furnishes Us	246
The Story of the Silkworm	249
The Home in the Desert	253
The Home by the Ocean	256
Homes and Work in the Sunny South	259
What is a Map?	273

INTRODUCTION

Too much has been expected of young children in the study of geography. Many of the so-called primary geographies are really not primary. They present a multitude of facts the most of which are beyond the power of the child to comprehend or retain.

Childhood is a period of active memory, but this is no reason why we should attempt to cram the mind with details of geography. Facts themselves are of no value. It is only in their relations that they become significant.

For the child of ten years it is not sufficient that facts be presented in their relations, but that these relations be such as will arouse interest through connection with the child's own experiences.

To expect a child in the fourth grade to draw a map of the state in which it lives, locate the principal rivers, valleys, mountains, bays, cities, and name and locate the counties, is wrong. Parrot-like memorizing of such facts, at that age, can result only in harm. The facts mean nothing and create a distaste for work.

We must start from home, from the environment of the child. We must build upon what has already become a part of its life. Definitions and disconnected facts cannot be assimilated.

In the home surroundings we can get the material which, if properly used, may be made the basis for the

superstructure in geography. The mind expands as the experiences increase. What the child has seen and felt itself must be the basis for an increase of knowledge.

The home is a little world. Here in miniature are the features of the great world outside. The forms of land and water, the animals and plants, the occupations and industries of men are represented. When these are understood in their simple relations the child can reach out and take hold of what he has not seen.

This work must be accomplished chiefly through the imagination, an important factor in the education of children. In their play the piece of wood may be a ship, and the water in the basin or pond the ocean. Let us watch this natural reaching out and then we shall be prepared to aid it.

Interest is another important factor. The weaving of the new, the unexplored, with the old and familiar in such a manner as to arouse the interest and attention fixes the new as no other method can.

If the natural method is followed, the child-mind will grow almost unconsciously, taking in and assimilating the materials of knowledge, which if presented in an artificial and uninteresting manner, would require laborious effort to fix.

If we use the term nature study for the most elementary work in geography, where the effort is not so much to impart information as to cultivate clear and discriminating observational powers, then the work of the third and fourth grades should be only an enlarged and expanded nature study.

But whether we call it nature study or geography

study we should not forget the chief object to be accomplished.

In this little book the author has attempted not to impart information as such, but to get at the meaning of phenomena by showing the relation existing between their various manifestations. Things have far more interest attached to them when we know their history; how they came to be as they are.

The child wants to know the "why" of what it sees, and in the explanation of this "why" its imagination is developed and interest aroused as in no other way.

HAROLD W. FAIRBANKS



THE OCEAN, THE HOME OF THE WATERS

Great, wide, beautiful, wonderful World,
With the wonderful water around you curled,
And the wonderful grass upon your breast—
World, you are beautifully dressed.

The wonderful air is over me,
And the wonderful wind is shaking the tree,
It walks on the water and whirls the mills,
And talks to itself on the tops of the hills.

You friendly Earth, how far do you go,
With the wheatfields that nod and the rivers that flow,
With cities and gardens, and cliffs and isles,
And the people upon you for thousands of miles?

—*W. B. Rands*



Official Photograph U. S. Army Air Service

THE LARGEST AIRPLANE IN THE WORLD

HOME GEOGRAPHY

THE EARTH UPON WHICH WE LIVE

We are going to learn about the earth upon which we live. This earth is made up of many things.

First, there is the land where our homes are. Then there is water, which we find in the hollows of the land. Besides the land and the water there is the air. We cannot see the air, but it surrounds us on all sides.

We could not live without land, water, and air. The land furnishes us the most of our food. The land is the home of many kinds of animals and plants. Some of the animals live upon plants, others eat the flesh of weaker animals. We use both plants and animals for food and depend upon them for our clothing also.

Every living thing needs water. Many plants and animals spend the whole of their lives in the water.

Some animals are fitted to move through the air. We see them flying here and there. Each animal is fitted for the place in which we find it. Fish swim in the water. Horses walk or run upon the land. Birds fly through the air.

The air has many uses. It carries the clouds from the ocean. The clouds make the raindrops which water the earth. Where it does not rain we find neither grass nor flowers.

The land and water are not at all alike. We can walk upon the land, but we sink into the water.

The top of the water is level. The surface of the land is uneven. In some places it is so rough that we can hardly climb over it.

In the valleys between the hills are the rippling streams. The water of the streams is running as fast as it can toward the hollows in the land. In the little hollows we find lakes and ponds of water. The oceans lie in the great hollows of the land. The pond in the little hollow may be so small that you can jump across it. The oceans are so wide that you cannot see the land on the other side of them.

All over the earth we find busy people. In the valleys they are farming. In the mountains they are digging for gold and other minerals.

They are sailing back and forth upon the oceans carrying many things from one land to another.

In some places there are great cities where many people live. They are all at work like the ants in their busy home. Some of the people in the cities are doing one kind of work, some are doing another.

Are you not glad to live in a world full of so many interesting things? Do you not want to learn all about it? We must not spend all of our time in play. We will take a part of every day to learn more about the strange and beautiful things around us.

By and by we shall grow up and become men and women. Then we shall have to work. The more we learn about the world the easier our work will be. The world will be our happy home.



At the top of the picture is a layer of dark, rich soil. Tell what lies below the soil. Why is the lower part of the bank lighter colored than the upper part? Do the roots of the bushes find much food in the lower part?

THE SOIL

How nice it is to play in the soft dirt! The wind also likes to play with the dirt. It picks up the dirt and blows it in our faces.

When the rain plays with the dirt it makes mud. How the mud sticks to our feet, and leaves dirty tracks upon mother's clean floor! The mud soils our hands and clothes. Is there anyone who does not know how to make mud pies?

We sometimes wish there was no dirt. What do you suppose would happen if our wish should come true? There would be no green fields. There would be no pretty meadows with their carpet of flowers.

Perhaps you know what the gardener calls the dirt in the fields. Did you ever hear him speak of the soil? He says that plants will not grow well if the soil is poor.

Let us find out what the soil is made of. Run out to the garden and get a handful of the dirt or soil. It feels fine and soft in our fingers. Here and there we find little hard grains and pieces of plant stems.

Now place the soil in a basin of water and shake it well. The water becomes muddy. It looks like the water which you see running down the street when it rains. Put your hand in the basin and at the bottom you can feel something soft like mud.

Pour the muddy water out of the basin into another dish. Pour in more water and again shake the basin. Turn off the muddy water as before. After you have done this a number of times the mud will be gone. Now the water remains quite clear.

Let us see what there is left of the soil. There in the bottom of our basin is a thin layer of sand. It looks much like the sand by the brook or upon the beach, but the grains are not of the same size. The larger grains have sharp points.

The sand by the brook was once mixed with clay. The water as it ran along finally washed the clay away and carried it down toward the river. The grains of sand were made smooth, so that we can find no sharp points upon them.

Let us turn now to our jar of muddy water. After it has stood some hours the water no longer looks dirty. The fine particles of clay or mud which floated in the water have settled to the

bottom. The clay feels very soft and slippery. There are no grains of sand in it.

Is there anything else in the water besides the clay? Yes, upon its surface there are many little pieces of leaves and stems of plants. These are soft and crumble if we try to pick them up.

We have found three things in the soil. There is first the sand, which feels hard and gritty when we rub it in our fingers. Then there is the clay in which we can feel no grit. When the clay dries it crumbles to a fine powder, and looks like the dust in the road. Last of all, there are the little pieces of plants.

Some kinds of soil contain much sand and little clay. Others are formed mostly of clay.

Would you not like to know how the soil is made?

QUESTIONS

What is meant by poor soil and rich soil?

What is it in the soil which makes it sticky when wet?

Will plants grow in clean sand?

Do all plants like the same kind of soil?

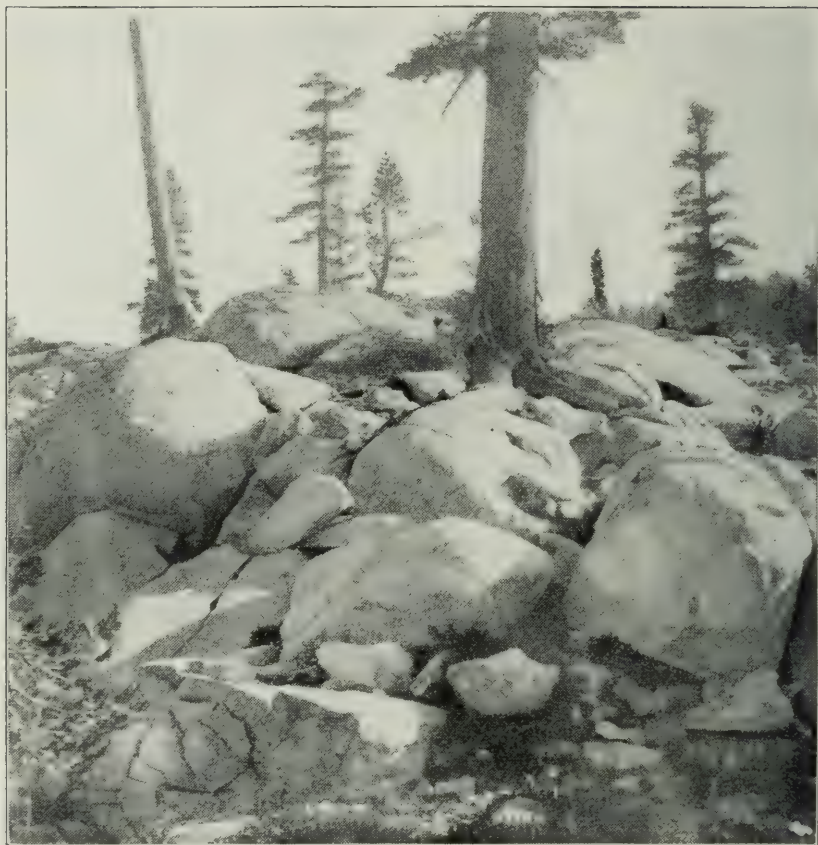
What do you think makes the soil dark?

What is the color of the plant stems which you find in the soil?

What is dust?

Pour water on some sand and also on some clay. Into which does it sink faster?

What becomes of plants when they die?



Tell all that you see in this picture. What is happening to the rocks? Is there any soil? Where do the roots of the large trees get the food they need?

HOW THE SOIL IS MADE

How is the soil made? Where does it come from? We can learn something about the soil if we watch the men who are grading a road through

the hill. Some of the men are driving horses hitched to great shovels on wheels. The horses pull the shovels over the ground and scrape off the soft dirt. This top dirt we call the soil. It is dark in color and full of grass roots and pieces of leaves and stems of plants.

Below the dark soil the men find the ground harder. Some of them are using picks to loosen it. A little deeper the ground becomes so hard that they can no longer pick it. Then they bring long iron rods called drills, and make holes in this hard ground. They put powder into the holes and explode it. The ground is blown into pieces which can be shoveled up and drawn away.

This hard ground is called rock. Soil is made from rock. We have already seen that where the men are working the soil forms only a thin layer on the top of the ground. As they dig deeper the soil soon disappears and rock takes its place. If you dig a hole in the ground anywhere you will at last come to rock. In some places the soil is very deep.

Here is a piece of rock which the men have blasted out. How bright and clean it is! There are sharp corners upon it which may scratch your fingers. How strange it is that rock like this can change to soil!

We will take a piece of the rock and pound it to dust. Why cannot we call this pounded rock, soil? It does not look like the dark soil which the men found on the top of the ground.

Let us plant some seeds in a pot of the dust which we made by pounding the piece of rock. We will also plant some in a pot of the dark soil. In this way we can learn how our pounded rock differs from the soil which Nature made.

In a few days the seeds sprout, and for a time the tiny blades in one pot look just like those in the other. Then a change comes. The little plants in the pot of rock dust almost cease to grow. They lose their bright green color. The plants in the other pot keep on growing. This is because the dark soil is full of food all ready for the plant to use, while the rock dust has but little food ready for the little roots to take up.

We have discovered now that the soil is something more than rock dust. Nature makes the soil from the rock in a very different way.

A long time ago there was no soil covering the rocks. Do you think we could have lived upon the earth then?

For many years the sun shone upon the rocks, and every day they became quite warm.



Here are bare rocks. You cannot see a bit of soil or any living thing. How long do you think it will take these rocks to crumble and make soil?

At night when the sun was gone they grew cold. The little grains of which the rocks are made became larger when they were warm and crowded each other. When it was cold they shrank away

from each other. In this way little cracks were made.

Rain fell upon the rocks and ran into the cracks. At last the rocks began to soften and crumble into little pieces. In this way a layer of soil commenced. Little plants sent their roots into the soil as well as the tiny cracks. The soil was poor and did not give the plant much food, but after a long time things were different. When the pieces of rock had crumbled very fine and pieces of leaves and plant stems became mixed with it, and many little animals had made their homes in it, there was formed the dark rich soil.

Our picture on page 14 shows another way in which soil is formed. In it you can see the bank of a stream. Perhaps you have visited one just like it.

The bank is made of pebbles and sand. These were washed here by the water a long time ago. At the top of the bank you can see a dark layer of soil. You can also see the roots of the plants reaching down into the soil. The dark layer at the top is rich in plant food. The sand and pebbles below can furnish very little food.

There are many animals which help form

the soil. The ground squirrels burrow in the earth and make it loose. There are also the earthworms who work the ground over and make it richer.

Now we have seen how Nature makes the soil.

QUESTIONS

Where have you seen solid rocks beneath the soil?

Have you seen men dig a well? Was the ground soft on the top?

Have you ever found a piece of crumbling rock? Could you break it in your hands?

Get a smooth pebble and try to break it with a hammer. Does it break easily?

If you have been in the mountains, you can tell us something about the rocks you saw there.

Find a bank where you can see the roots of plants reaching down into the soil. What do you find under the soil?

How deep do roots of plants go into the ground?

What do earthworms feed upon?

Mention some of the animals that live in the ground. How do these animals help make the soil better?

What makes rock crumble?

What does the farmer do to the soil before he plants his seed?



WHERE IT RAINS A GREAT DEAL

WHAT PLANTS NEED

There are three things which plants must have. These are soil, water and sunshine.

We have already learned what soil is and how it is made. When the little seed falls where there is not much soil it has a hard time to grow. If the rain waters it and the sun shines upon it the seed begins to swell and soon sends out a tiny shoot. This tries to push its way down into the ground, but if there is no soil the young plant dies in a short time.

The soil is deep and rich in the valley. This is the reason that we find the largest trees there. The farmer who lives in the valley raises a larger crop of wheat than the one who lives upon the hill.

Upon the hills the soil is often very thin. In some places the rocks may stick up through the soil. Plants do not love the rocks, for they cannot get food from them.

When the summer comes the plants upon the hills where the soil is shallow dry up and turn yellow. Shallow soil cannot hold water very

long. The plants in the valley can reach their roots deep. There are no rocks to stop them, and down they go until they get where the ground is moist.

Plants need water more than they do soil with food in it. If the soil is poor some of them will manage to grow. If there is no water they will all die. If you forget to water the plants in your window you will soon see by their wilted leaves how thirsty they are. Have you seen the plants in the field droop upon a hot summer day? This is because the sun and air are taking so much water from the ground that the plants soon begin to suffer.

A desert is a place where there is little or no water. In some deserts there are no plants to be seen. In others there are a few plants that have become used to living with only a very little water.

If it should rain in the desert the barren stretches of sand and clay would soon be covered with plants. This shows us that plants can get along without rich soil, but they must have water. Some plants will grow in pure sand if they have plenty of water.

There is another thing that most plants need. This is sunshine. Have you seen potatoes sprout-

ing in the cellar where it is dark? The little stems are slender and pale. If there is a window near they reach out toward it. They try hard to get where there is sunshine.



In the hollow among the rocks near the top of the mountain it is too cold for trees, but the pretty Alpine daisy finds a pleasant home in the warm nooks.

People as well as the plants need sunshine. Miners who work underground away from the sun are always pale. You never see them with rosy cheeks.

Did you ever think how much you are like a little plant? If you have plenty to eat and lots of sunshine you will grow fast and become strong.

The little plant that has plenty of light and deep, moist soil is strong and happy.

Most plants do not grow during the whole year. In the spring and summer they do their work. In the winter they rest. From this we see that plants need something more than soil, water, and sunshine. They must also have warm weather in order to grow.

Perhaps you live where it is warm in winter. Roses and oranges are blossoming out of doors. Do plants ever rest where it is warm all of the time? Watch some of them and you will soon find out.

QUESTIONS

Mention the things which plants need.

Do you know why the soil is deeper in the valley?

Does the water carry away any of the soil from the hills when it rains?

Of what use are the roots to plants?

What holds trees from falling when the wind blows?

If it should rain in the desert, would the country look different?

Have you ever seen plants growing in water and without soil?

Do all plants need sunshine?

Have you seen any flowers that close in the night and open in the sunshine?

What is it that gives the rosy cheek to the apple?



SUMMER, IN THE SHADE OF THE OAKS

THE SEASONS

What is it that looks in at your window in the morning? What brings the light, and wakes up the little birds, and opens the flowers?

It is the sun that makes the day bright. When the sun has gone the dark comes. Then we rest until another morning. The sun is the life of the world. It warms the air and makes everything grow.

All days are not alike. Some are warmer than others. In the summer the sun climbs higher in the sky than in the winter. The higher the sun is the more heat we get from it. This is the reason that summer is hotter than winter.

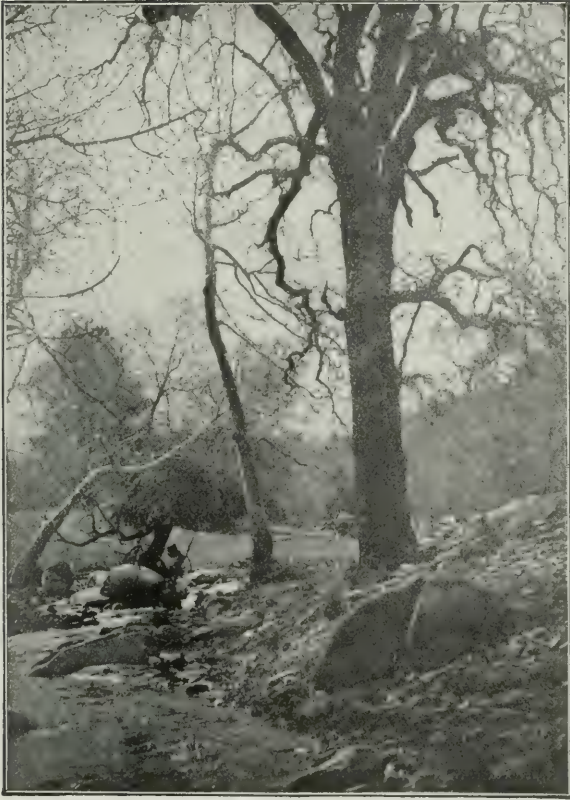
Drive a stick into the ground. Now watch the shadow which the sun makes it throw upon the ground. The shadow will be long in the morning and evening. When the shadow is shortest the sun has reached its highest point in the sky. It is then noon.

At noon in the summer the sun is almost overhead. The sun feels hot and the shadow of the stick is very short. The sun is not as high at noon in the winter. The days are not so warm and the shadow is much longer.

If you watch the shadow of the stick for a number of days you can tell whether summer or winter is coming. If the shadow is a little shorter at noon each day the sun is getting higher in the sky. That means that summer is coming.

When the shadow is very short at noon you may know that it is summer. The days are long and the air becomes very warm.

It is so warm that the cattle go into the shade. The birds stop singing. Even the boys and girls forget to play.



FALL

After a time it is not so warm. The sun does not climb so high in the sky. The farmer gathers in the corn. The apples are picked and put in the cellar. This is the beginning of fall.

Soon Jack Frost comes at night and touches



WINTER

the leaves. We see them dropping from the trees all through the day. Now the air is very pleasant.

The shadow of our stick continues to grow longer day by day. Now it is winter. The trees are bare and Nature seems to have gone to sleep. The farther north we go the colder we find the weather. There are snow and ice, and people have to build warm fires to keep from freezing. The sun comes up late in the morning



COCONUT PALMS IN FLORIDA

and looks down upon the earth for only a little time each day.

Toward the south it does not get so cold. The sun there does not sink so low in the sky and this heat keeps Jack Frost away. In the

south the winter is the pleasantest part of the year
The oranges are ripe and flowers are all around.

After winter comes spring. The sun again climbs higher in the sky. The days become warmer. The animals come out of their holes. The trees and plants put out their leaves and fragrant blossoms. The birds return and fill the air with their music.

There are four seasons in each year, winter, spring, summer and fall. The time from one winter to another is called a year.

We think that each season as it comes is the nicest. We are glad that the days are not all alike.

QUESTIONS

Tell all the signs of spring that you know.

How do you know when it is fall?

What time of the year are the nights the longest?

Why does it become cold when the sun goes down?

Does the sun always rise in the same place?

Mention some trees that do not drop their leaves in the fall.

Mention some of the nuts that are ripe in the fall.

When does the snow fall?

What time of the year are the days the longest?

What season is the earth the prettiest?

In which direction does the sun rise?



Courtesy of the Seattle Chamber of Commerce

A BERRY FIELD UNDER THE SHADOW OF MOUNT RAINIER, NEAR SEATTLE
AND TACOMA, WASHINGTON



HOW THE SEASONS AFFECT PLANTS AND ANIMALS

We have found that plants need food, water and sunshine. Plants get their food from the soil.

Animals need food and water, and the most of them love sunlight, but there are some that hide away from it. Many of the animals get their food from plants, but some feed upon other animals that they can kill.

Everything that lives has its time to rest and sleep. When do you suppose that time is? Can it be in the winter or in the summer, or is it at

night? If you said any one of these, you would be partly right.

Most plants and some of the animals sleep a part of each year. The time which they take to sleep depends upon the climate of the place in which they live. The most of the animals sleep a part of each day or night. Plants do not grow as fast at night as they do in the daylight.

In cold countries plants sleep in the winter. We know they are going to sleep when their leaves begin to fall. When the cold winter comes they stand so bare that they look as though they were dead.

When the trees begin to feel the warmer days of spring the sap starts again from their roots. It goes up the trunk of the tree and into each tiny branch. The waiting buds soon commence to swell. Almost before we know it the trees are again dressed in green.

The children all know that spring has come when they can find the pussy willows. The willow is one of the first trees to wake up and open its little blossoms.

Many plants do not live through the winter. Each spring a new plant grows from the little seed. Very soon we see it blossom. When it is fall and the cooler weather drives away the

summer, the seeds are ripe and the first frosts kill the mother plant.

In warm countries plants sleep during the dry season. If summer is the dry season, then they grow in the winter. Such a country is green and beautiful in winter. In summer the ground becomes dry and the whole world seems dead.

There are many animals that crawl into their holes and go to sleep when fall comes. They do not move until spring wakes them. The first warm day brings them out of their winter home. The earth, the water and the air are full of life, where a little time before everything seemed dead.

Every plant and every animal is suited to the place in which you find it living. If you carry an animal or plant away from its home you must give it a home much like the old one. If you do not it will die. The animals in the cold north cannot stand the heat of the south. A plant which is used to having a great deal of water will not live where there is little water.

The birds do not stay in one place through the year. When winter comes they go toward the south. In the spring they return to their northern homes, where they make their nests and raise the young birds.

People do not move back and forth as the seasons change. They put on warmer clothing for the winter and store up food to eat. Some animals do the same. Their hair grows longer and thicker and thus they are protected from the cold.

QUESTIONS

Mention some trees that drop their leaves in the fall.

What trees keep their leaves through the whole year?

Mention some plants that die in the fall.

Do you know any plants that never rest?

What makes the plant begin to grow in the spring?

What is the sap? Where do the roots get it?

Can the tree grow when the ground is dry?

What effect does frost have upon the garden plants?

Do you know any animals that store up food for the winter?

What does the bear do when winter comes?

Did you ever find a snake or a lizard in its winter home? How did it act when you disturbed it?

Find a lizard some cold morning and place it in the sun, and see what it will do.

What time of the year do you see the wild ducks and geese?

What becomes of the birds in the winter?

THREE FORMS OF WATER

We have seen that water is necessary to the life of plants and animals. Now let us try to find out something about the properties of water.

There are three different forms which water takes. Each is very unlike the others. They are so unlike that if we had not seen one change into another we should hardly believe that they were different forms of the same thing.

There is first the common form. You all know this one; it is the water which we drink. If we go far enough in any direction we come to water. It forms all the streams and lakes as well as the great oceans. There is more water than anything else upon the surface of our earth.

Water is a liquid. By liquid we mean something that can be poured. We take a cup of water and pour it into a basin. It takes the shape of the hollow in the dish that holds it. A solid does not act in this way. It keeps its shape.

Water is not the only liquid. There are many others. We have many substances which form solids at the ordinary temperature, but if

they are placed in a hot place they become liquid. The heavy mineral we call lead is a solid. It is useful in making water pipes and shot. If we heat lead it melts easily and becomes a liquid. It can then be poured like water.

There is another form of water called steam or vapor. When water is heated it changes to steam. The particles of water forming the steam are so small that if you could look into an engine boiler you could not see them. When the steam comes out of the engine into the cool air the little particles run together and form others large enough so that they can be seen. Now we have a dense white cloud about the engine.

When water is changed to steam it takes up very much more room than it did before. Each of the tiny particles of water in the steam is very warm. It wants lots of room. Each one pushes against his neighbors as hard as he can. This is why the lid of the tea-kettle jumps up and down.

When steam is shut up tight we can make it work for us. The little particles push with such strength that they can make the wheels of a heavy engine turn around, and draw a long line of loaded cars.

There are tiny water particles all about us in the air. They are invisible except when they

turn into clouds or fog. At night they form the dew which makes the grass so wet.

The third form of water is ice. When water becomes very cold it turns to a solid substance which we call ice. We all know how clear and smooth ice is. We cool our water with it upon hot summer days, and in winter we skate over its slippery surface. The children of warm climates do not know the pleasure of skating. Where do you suppose the ice comes from that is used where it is never cold enough to freeze water?

We call frozen water ice. When the air becomes warm the ice begins to melt. In a little time a cake of solid ice will change to water.

When water freezes it wants a little more room than it did before. This is why your pitcher is broken when the water in it freezes.

Hailstones are frozen raindrops. The drops of water falling through the air sometimes become so cold that they turn to ice.

Can you tell what the pretty snowflakes are made of? They are frozen clouds. They fall very gently and make everything pure and white. Each flake has six sides or points like a star.

If you live in the South and have never seen the snowflakes get your papa to take you to the mountains, when the winter storms come.



WINTER SCENE IN NEW ENGLAND

QUESTIONS

Mention some other liquids besides water.

How is a solid different from a liquid?

What makes water boil?

What are the little bubbles in boiling water formed of?

How do clouds differ from steam?

Mention some solids that can be melted?

Can you think of any other vapors besides steam?

In warm countries water does not freeze. Where do they get the ice which is used?

Is ice lighter or heavier than water?

What is the difference between snow and hail?

Does it ever snow where you live? Why does it snow upon the mountains more often than in the valleys?



THE ROCKY SHORE OF THE OCEAN NEAR WHICH IT IS DANGEROUS FOR
BOATS TO GO

What do we call the rocks that rise out of the water?



A SAND BEACH, YORK HARBOR, MAINE

What do we call an arm of the ocean like that in the picture? Is this a safer place for boats than the shore in the last picture? Why do people come to the beach?

WHERE THE WATER COMES FROM

Day and night the brook ripples over the pebbles. It never gets tired and never stops. Did you ever wonder where the water of the brook comes from, and where it is going?

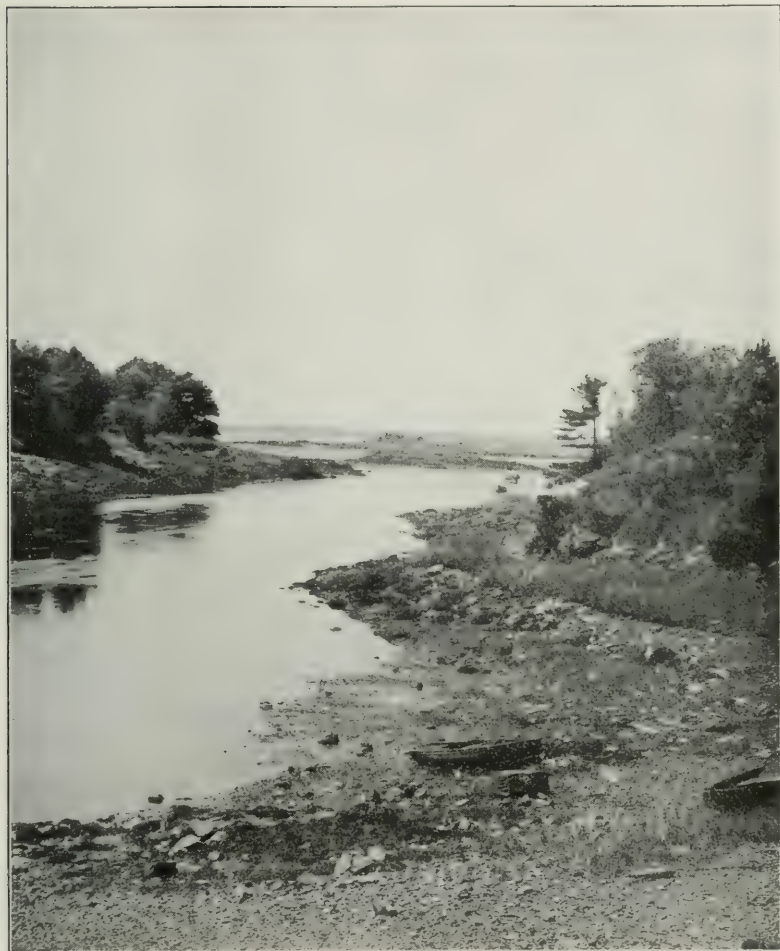
Let us follow up the brook and see where it starts. Back into the hills we must go. We leave the meadows and the pretty valley. Up we climb until the slopes become steep and the brook dashes from rock to rock. Still smaller brooks join here and there, but we follow up the main one until at last we find where the stream starts. Under a mossy bank there is a clear spring. The water comes bubbling up out of the ground and runs singing away down through the hills.

If you want to know where the water of the spring comes from you must ask the raindrops. If we can find the home of the raindrops we shall find where all the water comes from.

We are sure that the raindrops are the source of the spring, for in the desert, where it does not rain, there are no springs.

It does not rain when the sky is clear. The drops of water come from the clouds which come up and hide the blue sky. Where do the clouds come from? We will follow them back to where they start. We pass over valleys and hills, and at last find ourselves far out over the ocean.

The ocean is the home of the clouds. The ocean stretches farther than we can see. It covers three-fourths of the surface of our earth. From



Courtesy Boston and Maine R. R.

A RIVER IN NEW ENGLAND

over it all the little water particles are rising day by day. When they get up where it is colder we can see them. Now we call them clouds.

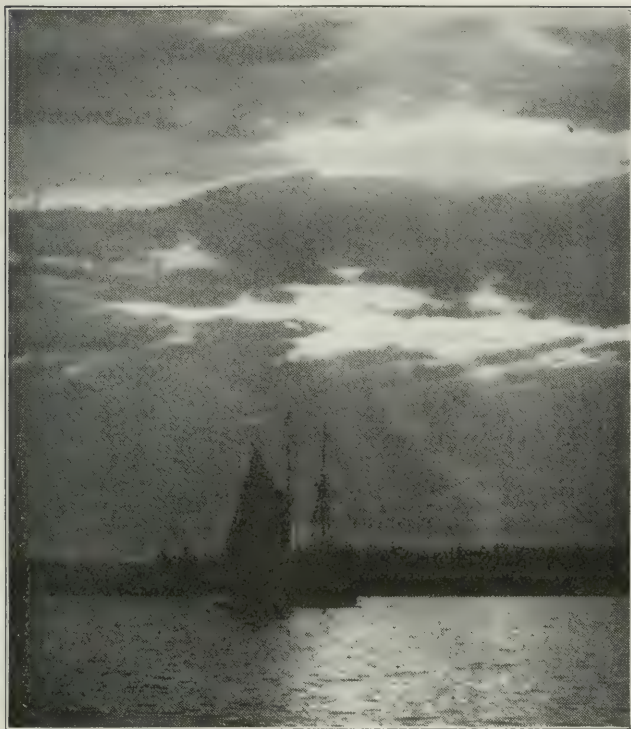
How do we know that water particles are rising from the water into the air? We set a basin of water out doors and after a few days the water has disappeared. It could get away only by going off in the air.

We cannot see the water particles leave the basin, but if we watch a pond of water when the air becomes cool at night we shall learn something about it.

Sometimes you will see a thin cloud or mist rising from the water. You can see the mist only when the water is warm and the air is cool. You remember that steam from the engine boiler becomes visible when it comes out into the air because the air is so much cooler.

The mist rising and hanging over the pond is made of water particles. On cold mornings you can see them in your breath. How often you have puffed your breath out and played that you were a steam engine. Your breath contains these water particles all of the time, but they can be seen only when the air is cool.

The most of the water particles in the clouds start upon their journey from the ocean; for the



CLOUDS ON THE OCEAN

ocean, you know, contains the larger part of the water upon the earth. The winds blow across the ocean and over the land. They carry the water particles, or vapor, with them. When they reach a region of colder air they form great masses of clouds. At last the little particles of water unite to form drops. These are so heavy

that they cannot remain in the air any longer and so fall to the ground.

Some of the water sinks into the ground. This makes the cool springs. The rest runs away on the top of the ground. It becomes dirty and forms the muddy rills which we see during a rain storm.

All over the world streams of water are hurrying to the ocean. If the water never came back the ocean would by and by become dry, just as our basin did.

If there were no clouds the water would soon all gather in the ocean. The dry land would become a desert and nothing could live upon it.

So the water is always traveling from the earth to the sky and back again. The same particles never go in the same place twice. They are always seeing new places and meeting new people.

The water in the ocean is useful to us. It bears the ships from one part of the earth to another. In the sky it forms the clouds which furnish the refreshing rain. As cool springs, it satisfies our thirst. At last, as little brooks, it runs away to join the river, and the river bears it again to the ocean.



WORK OF THE OCEAN

QUESTIONS

What time of year does it rain the most?

From what direction does the rain come?

When are the brooks the lowest?

Would the brooks dry up if no more rain fell?

Is spring water clear or muddy?

Why do many flowers grow about springs?

Where do the rivers empty their waters?

Why does not the ocean fill up and overflow its banks?

Of what use are rivers?

Where does water run the faster, up in the hills or down in the valley?

How do people get water where there are no springs or running streams?



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EFFECT OF THE WIND ON THE TREES

THE WIND

What is the wind? We can feel the wind blowing upon our faces. We can see what the wind does, but we cannot see the wind itself.

Sometimes the wind blows against us so strongly we can hardly stand up. The wind carries our hats down the street. It tips over houses and great trees.

All about us there is something which we

cannot see. We call this the air. The air keeps us alive. At every breath our lungs are filled with it.

When the air moves we find it pushing against us. Wind is then only the air in motion. The air surrounds the whole earth. It is never quiet, but is always doing work. It makes the windmill go around, and sends the ships across the sea.

On a summer day the wind cools our cheeks and rustles gently in the trees. In the winter it is fierce and strong. When it blows very hard we say there is a storm. Then the air rushes swiftly along and sometimes does a great deal of harm.

Now what is it that makes the wind blow? You have all sat by the fireplace and watched the flames roar up the chimney. The fire makes the air near it very hot. Hot air is lighter than cold air, and is pushed upward by the cold air which rushes in and takes its place. As soon as the cold air becomes warm, it, in turn, rises, and this makes a wind up the chimney. We say the fire draws well when the air moves fast. You cannot see the air moving, but hold a little paper windmill in front of the fireplace and it will turn around as it does in the wind out of doors.

Winds blow over the earth for the same reason that air draws up the chimney.

The sun shines upon the earth and makes it hotter in some places than in others. Where the air becomes hotter it rises faster, and the cool air rushes along to the place where the hot air was. When this happens we feel the wind blowing.

The wind may blow from any direction. The north wind is usually cold. It makes us shiver and put on our coats.

The south wind is warm. It brings the rain and the spring flowers. The south wind wakens all Nature from its winter sleep.

When clouds cover the sky and the south wind blows, people say it will rain.

After the rain the wind changes and blows from the north. It soon chases all the clouds away. Now we have fair weather.

QUESTIONS

We cannot see the air. How do we know that there is such a thing?

What time of the year is there the most wind?

What time of the day does the wind blow the least?

Mention some kinds of work done by the wind.

If the air is hotter over the land, will the air blow toward the ocean or from the ocean?

Where do people go in summer to get cool breezes?

What damage is sometimes done by storms?

Mention the different winds which blow where you live.

What is it that makes waves upon the water?



STORM CLOUDS WITH THUNDER HEADS ABOVE

THE CLOUDS

The dark clouds are coming up. They are sweeping over the blue sky and will soon hide it. Why do you suppose they rush along so swiftly? It is because the wind is chasing them. It is blowing behind them and they cannot stop.

There are many kinds of clouds. Can you tell us about some of them? I am sure you know the storm clouds. They look dark and angry. Wherever they go they strew raindrops

over the earth. The farmer welcomes them, for the thirsty land needs water. They will make the meadows green again.

The rain may pour down from the clouds for many hours. Sometimes they give us so much water that we are afraid it will flood the earth. But at last the clouds seem to become tired. They melt away and let the bright sunshine down on us again.

How thankful all Nature seems for the refreshing rain! The birds sing again, and everything is bright and fresh.

Who does not love to watch the thunder clouds upon a summer day? After the sun has risen high in the sky and the air becomes warm, little clouds appear here and there in the blue sky. They act as if they were lost, and we wonder what they can be doing. They keep growing larger and larger, and at last pile up in great rounded masses. The sky is, at times, almost filled with these towers of white.

As we look at these clouds we might imagine that they are hills and mountains far away. Or fancy we can see in their changing shapes the forms of very strange and wonderful animals.

At night we love to watch the flashes of light that come from the thunder heads. The



The fog in a mountain valley is breaking up to form clouds. The mountain in the back of the picture is the highest in the world.

lightning darts here and there. Sometimes we hear the thunder. It sounds like a distant wagon rolling over the stones.

The fleecy clouds are very different from the storm clouds and thunder clouds. They do not give us rain. They seem to have nothing to do. There they float so daintily, as if only for us to look at them. They seem like patches of cotton dropped across the sky. The sun plays hide and seek among them. Now the sun shines hot upon us, now the little clouds hide it.

There is another kind of cloud. I wonder if you have seen it. Clouds of this kind float high in the sky, far above all the other clouds. They look like dainty wisps of soft hair. They are called cirrus clouds.

The clouds which you have seen hanging around the top of a mountain form there because the air is cold. We have learned already that cold changes the little water particles floating in the air into such form that we can see them.

When clouds come down to the ground we call them fog. We do not love the fog. It shuts us in so that we can hardly see which way to go. Watch the fog closely and you will see the little water particles of which it is made. These hang themselves upon our clothes and we soon feel damp.

Have you ever stood upon a hill far above the fog? As you look down upon the fog it seems



This is a mountain valley filled with fog. Describe all that you see in the picture.

like a great ocean of water. The hills rise above the fog like islands.

Fog is quite useful in countries where it does not rain much. It protects the ground and plants from the sun so that they do not dry up so quickly.

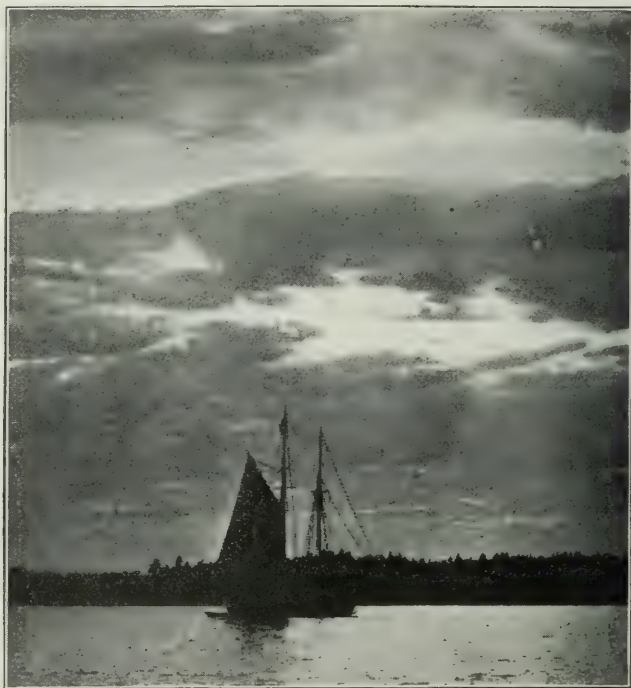
QUESTIONS

From what direction do the rain clouds come?

What wind brings fair weather?

What time of the day are there the most thunder clouds?

What makes the thunder?



CLOUDS ON THE OCEAN

What is dew? Frost?

When does the dew fall?

If you fill a glass with cold water upon a warm day, what appears upon the outside of the glass?

When do you have the most fog, in the morning or middle of the day?

What makes the fog disappear?

What makes the clouds which float about the sides of the mountains?

Where does the more rain fall, upon the mountains or in the valleys, and why?

Tell something about the clouds when you think it will rain.



AN ARTESIAN WELL, COACHELLA VALLEY

This is an artesian well out of which the water flows without pumping.

SPRINGS

Hour after hour the rain beats against the window. Where can so much water go to? Some of it runs down the street in muddy torrents. Some of it soaks into the ground. You have seen a sponge absorb water. The ground takes up water in much the same way.

After the rain stops we find little ponds in all the hollows. In a few days the water is gone. What do you suppose has become of it? You have already learned that water particles are rising from the ocean all of the time. They are rising also from every pond of water. The basin of water left upon the door step will become dry if it stands a few days.

All of the water of the pond does not change to vapor in this way and disappear in the air. A part slowly sinks down through the ground. Down, down the water goes into the soft soil. Finally it reaches the rock which we have learned is below the soil. Does the water stop then? No; for there are little cracks in the rock. The water slowly creeps into these cracks and so keeps on its journey into the earth.

The cracks are small and the water goes slowly. Finally some of the little cracks unite and form larger ones. In the larger cracks the water can run faster and now we have a bubbling little stream. It is far, far below the ground on which we walk.

Will the water ever come out into the sunshine again? Let us see. The land, you know, is not smooth. There are hills and valleys and cañons. As the little streams flow along underground some of them may come to one of these cañons or ravines. If a cañon lies in the path of a little stream it will all at once slip out through the rocks into the bright sunlight.

In such a place we have a spring. The water which was muddy once is now clear. The dirt was lost in the long journey underground. We think there is no other water as good as spring water.

The ferns and grasses love the water. They grow up and shade the spring from the hot sun. It is pleasant to think that they do this through gratitude for the pure water given them.

Many of the underground streams never find a cañon in their path. They go deeper and deeper into the earth. At last they come where the rocks are very warm. The farther they go



GEYSER, "OLD FAITHFUL," YELLOWSTONE PARK

the hotter the rocks become. At last they are hot enough to turn a part of the water into steam.

The steam will not let the water behind it go any farther. It pushes the water back and makes it flow toward the top of the ground again. When this water comes out upon the top of the

ground it forms a hot or boiling spring. You can cook eggs or potatoes in such a spring. The water of hot springs is often used as a medicine. This is the story of the water that was lost in the ground.

When people dig wells they try to find one of these underground streams. They often do find a tiny stream. Sometimes they find one so large that they have to climb out of the well very quickly.

QUESTIONS

Have you ever seen a spring? Describe its appearance.

Which does water sink through quicker, sand or clay?

What kind of soil is it where ponds stand a long time?

What makes the water of some springs so cold?

What do we mean by saying spring water is hard? What do we find in the bottom of the tea-kettle after spring water has been boiled in it a long time?

What is a mineral spring?

Tell why some springs have warm or hot water.

Do springs ever dry up in the summer?

Describe a well.

How is the water gotten out of a well?

How does a well differ from a spring?

What makes you think the earth is hot inside?

Of what use are hot springs?

EVERYTHING HAS WEIGHT

We have all seen a magnet. We have watched it pick up little pieces of iron and hold them tightly.

The great earth upon which we live acts like a magnet. It pulls everything toward itself. The pull or attraction of the earth is what makes things have weight.

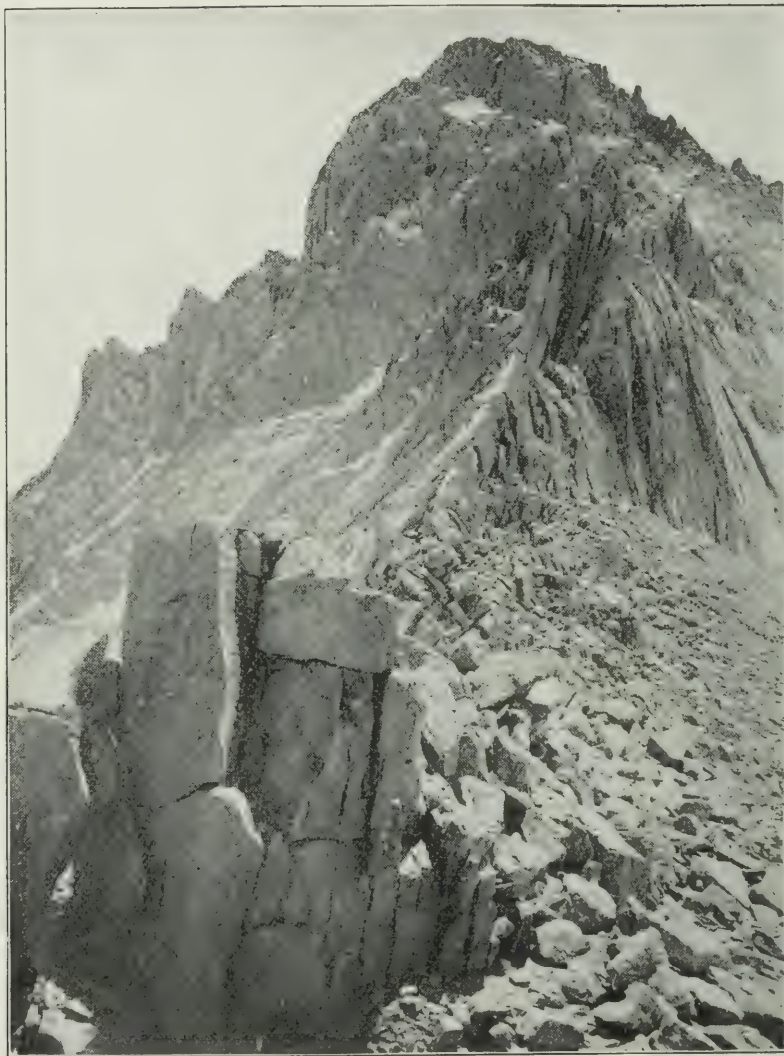
A piece of iron is heavy. You can hardly lift it because the earth pulls it strongly. A piece of wood the same size as the iron is light. You can lift it easily because the earth does not pull it so strongly.

If you throw a ball into the air it falls quickly to the ground. A feather will fall, but not so quickly, because the air holds it up.

How easy it is to run down hill! It is hard work to climb back up the hill. The earth is pulling you down the hill. If you stumble it may cause you to fall.

If it were not for the pull of the earth we could not go coasting. If you threw a ball in the air it would not come back to you.

The pull of the earth is helping to tear



MOUNT WHITNEY. ONE OF THE HIGHEST MOUNTAINS IN THE UNITED STATES

See how the rocks are crumbling and falling, because of the pull of the earth.

down the mountains. Did you ever think of that? At the foot of the cliffs there are great fragments of rocks which have fallen from above. If you climb the cliff you will find many pieces of rock ready to fall. Push one with your foot. Down it goes tumbling and rolling to the bottom.

It is the pull of the earth that makes water run down hill. Look out of the window when it rains. The little streams of water are hurrying past. The earth is pulling them and they are trying to find the lowest place. Perhaps they will have to run many miles before they can rest.

Here is a hollow in the ground. Some of the water has found it and formed a little pond. Take a spade and dig a ditch through the rim of dirt which holds the water. Away it goes through the ditch. The earth is pulling it and it cannot stay.

The earth pulls the balloon as it does everything else, but the balloon rises because it is lighter than the air. Ducks can swim upon the water because they are lighter than the water.

A stick floats upon the water because it is light, but a piece of lead drops to the bottom. It is heavier than the water and the earth pulls it down to the bottom.



Courtesy Boston and Maine R. R.

A MOUNTAIN BROOK

QUESTIONS

- What would happen if the earth stopped pulling things toward itself?
What makes things feel heavy?
What is the heaviest thing you know?
Which falls quicker, a feather or a ball? Why?
Why will a wagon tip over on a side hill?
What is another name for the pull of the earth?
Why is it dangerous to climb along rocky cliffs?
Does water run on level land?
How can you tell which way the road slopes?
In what part of their course do streams run the swiftest?
Why does water stay in a pond?



THE WORK OF RAINDROPS

WATER WORKS FOR US

We train horses to draw our wagons. We put up windmills. The wind makes them go round and pump water for the cattle to drink.

The sailor places sails upon his vessel and the wind blows him merrily along. The engineer places water in a boiler and heats it until it

changes to steam. The steam makes the engine move and work for us.

Long ago people did not know that steam could be made to do work. Then they used water to make their mills go and grind the grain.

Let us look around and see the work which water does. When a raindrop strikes your face it hits a tiny blow. The raindrops which run from the roof dig a little ditch by the side of the house. When thousands of little raindrops meet and travel together they often do a great deal of work. Sometimes we wish they did not do so much work.

As the raindrops rush along they dig a deep ditch in the soil. They do this by carrying off the dirt, grain by grain. They become very muddy, but they do not seem to care.

Have you ever seen great holes washed in the road by the torrent of raindrops? People cannot travel for a time. It may take many men several days to fill up the hole made by the torrent.

If you live by a river or mountain brook you have seen the water roll pebbles along. The river sometimes washes away people's houses. It has destroyed whole farms.

The waves of the ocean also do work. They never become weary. They are tearing the rocks



Courtesy Boston and Maine R. R.

SAND DUNES

down and grinding them to pieces. They make the sand which you delight to play in.

Sometimes the waves throw great ships against



A WATER WHEEL

the rocks. They seem to be happy in breaking things in pieces and doing all the harm they can.

How do you suppose men harness the water and make it work? It is a pleasant trip to the old mill. There we can learn more about the work of water, and how water is harnessed.

The mill stands by a little creek. Above the mill you will see a pond of water held by a dam. The dam is made by piling logs or rocks across the bed of the stream. The dam holds

the water back so that it cannot run along as it used to do.

Upon one side of the mill-pond the miller digs a ditch. At the lower end of the ditch he places a large wooden wheel. This is called a water wheel. When the dam is full of water the miller turns the water into the ditch. The water runs through the ditch and onto the wheel. The weight of the water makes the wheel turn around. The wheel makes the mill go to grind the grain or do any other kind of work. The mill may weave cloth. It may make electricity to give us light.

Mills are sometimes placed where there is a water-fall. Then it is not necessary to make a dam.

QUESTIONS

Mention some of the things which work for us.

Mention some of the kinds of work which you have seen water do.

What does the river do with the dirt which it washes from its banks?

What kinds of work does the ocean wave do?

Describe a stream near your home after a hard rain.

Tell how water makes the water wheel turn around.

How are dams made to hold the water?

What harmful kinds of work does water do?

What makes the water come out of the hydrant with such force?

In what kind of a country will water do the most work, a hilly or a level one?

Would there be any waterfalls if there were no hills?



A PLAIN

THE SURFACE OF THE LAND

Do you live where the land is smooth almost as far as you can see? Your home, then, is upon a plain.

The plain seems as level as a floor. But is this really so? If the plain were perfectly level the rain which falls upon it would not run off. The land might then be flooded.

Can the river tell us anything about the slope of the land? Let us see. Stand upon the

bank for a time and watch the water. Does it stand still like the water in the pond or does it move? Watch that little stick upon the water and you soon can tell. See, the stick is moving. It comes nearer. It floats in front of you, and soon it is out of sight.

This shows us that the water in the river is moving. It is flowing across the plain on which you live. The plain must slope a little. The slope is in the direction in which the river flows.

Is your home in a valley? Then you live on the lowland between hills or mountains. The valley is long and narrow like a great trough. A river flows into the valley at one end and out at the other end. You can easily see that the valley slopes in the direction in which the river is flowing. The steeper slopes are upon the sides of the valley where the little brooks trickle down to the river.

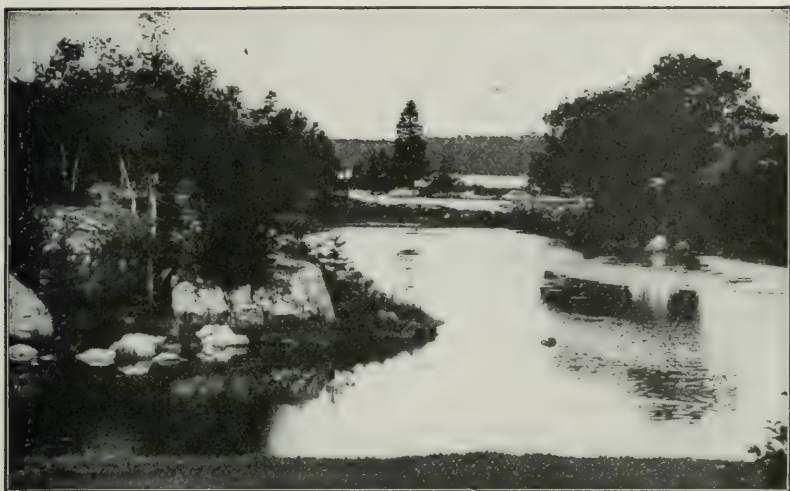
Your home may be far above the valley and in the mountains. Then there must be rough rocks and steep slopes all around your home. There is just enough smooth land upon which to make a little garden. Here you have no trouble in telling which way the land slopes. The land is so steep that if you are not careful you will fall and get hurt.



The river made the canyon through which it flows. Why is there no one living in the canyon? Why do railroads make use of canyons?

The water of the mountain brook does not flow quietly like the river in the plain. It tumbles noisily over the rocks. It will at last join the river by the easiest path it can find.

Wherever we go we shall find the land sloping in some direction. The broad, gentle slopes we may call plains; the open hollows between the hills or mountains are valleys; while



THE RIVER WINDS HERE AND THERE

the deep gashes which the rivers cut in the mountains are cañons.

If we follow the river to its head we shall see these three different land surfaces. In its lower course the river winds here and there over a broad plain. It seems as if it hardly knew which way it wanted to go.

After passing the plain we find hills beginning to rise on either side of the river. We pass up the valley which the river follows between the hills. The land along the river is rich and we see many farms.

After a time the valley narrows and the river

flows more swiftly. At last we come to a place where the hills come close to the river. There is no land between the rocky slopes and the river. The river rushes along between steep cliffs which almost shut out the sun. Now we are in a cañon. We follow the cañon far back into the mountains until it splits up into many little ravines. Each of these has been formed by the waters of many rains and springs.

QUESTIONS

Describe the country about your home. Is it a plain, a valley or a mountain on which you live?

Where do you find swampy places?

Have you seen the river flood the lowland along its banks?

What makes the flood? Does it do any harm?

How do you think the valleys were made?

Do you think that water had anything to do with making the valleys? Why?

How does a valley differ from a plain?

Have you ever been in a canyon or ravine? If so, describe it.

What is the difference between a hill and a mountain?

Where do the streams run quietly, in the valley or high in the mountains?

Where do the rough rocks stick up and form cliffs for waterfalls?

Is there much level land in the mountains?

Where are there the most farms, in the valley or in the mountains?

Where does the water of the river go to?



THE OCEAN

Where is all the water of the river hurrying?
It tumbles over the cliffs. It dashes past the
rocks.

The source of the river is in the mountains.
It is formed by the little rills that are forever fed
by the springs. The rills unite as do the branches
upon a tree. At last they make the mighty river.

The river soon leaves the mountains. It flows
slower, for its bed is not so steep. Now it rests
in quiet pools shaded by willows. Now it ripples
in soft music over its sandy bed.

Finally the river reaches a broad plain through which it slowly winds. It does not want to go farther. It seems to know that a little beyond the great ocean waits for it. The river will soon be lost in the ocean. Its work will be done.

Rivers are flowing into the ocean from all the land upon our earth. Would you not think that by and by the ocean would fill up and run over its bank? Stop and think a moment. Have we not learned that water particles are leaving the ocean every moment and forming clouds? The water is being lost from the ocean as fast as it comes in. This is the reason it always remains the same. The water which the clouds carry away at last comes back in the rivers.

You can now tell the story of the raindrops. It is a long story from the time they leave the ocean until they get back again.

The ocean contains something which we put in our food. If you have tasted ocean water you know what this is. Place a pinch of salt in a cup of water. The salt dissolves in the water. It makes the water taste much like that from the ocean.

Let the cup of water stand in a warm place for a few days. The water will go off as vapor. The little water particles will spread through the

air, but you cannot see them. Is there anything left in the cup after the water has gone? Yes, there in the bottom is the salt which we dissolved in the water.

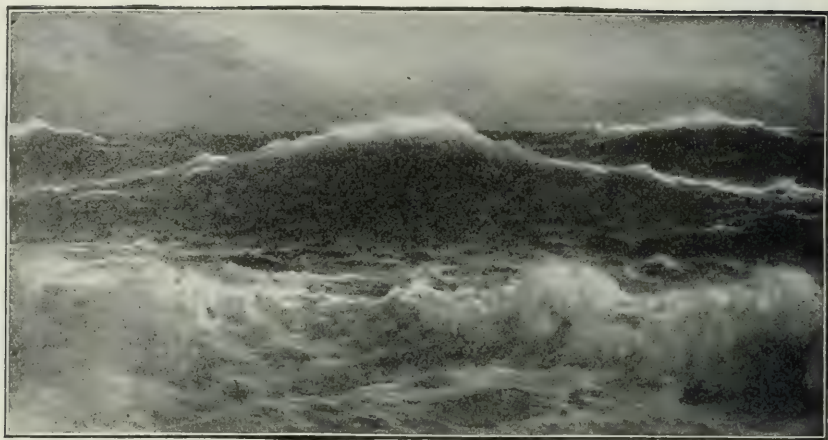
The little water particles when they turn to vapor cannot carry away the salt. This is why the clouds do not contain salt water. Would it not seem strange if the raindrops were salty? We would think the clouds were shedding tears.

About three-fourths of the earth upon which we live is covered by the ocean. If there were a little more water the oceans would cover nearly all the land. The fertile plains would be beneath the water. There would be left only the mountains rising above it.

The islands in the ocean are the tops of mountains. If there were less water in the ocean many of the islands would be connected with the continents.

Who can tell why the ocean is where it is? Water, as we have learned, runs into the lowest place that it can find. We have also learned that the surface of the earth is uneven. There are hills and valleys and plains.

When the water was formed it ran into the lowest hollows upon the earth, and in this way the oceans were made.



OCEAN WAVES

QUESTIONS

Have you ever seen a river?

Tell us where it comes from and where it is going.

Why does not the ocean fill up and overflow its banks?

Tell the story of the raindrops.

When does the ocean lose the most water, on a cold day or on a warm day?

How can you show that water is passing into the air all the time?

Of what use is the ocean to us?

Is ocean water good to drink?

Where does our salt come from? Can you tell how it is made?

If you put some salt in a cup of water, how can you get the salt again?

Is your home upon an island or a continent?

If you have ever seen an island, tell what it is.

If there was much more water on the earth, what would happen?

How is the ocean different from a lake or pond?

THE WORK OF THE OCEAN

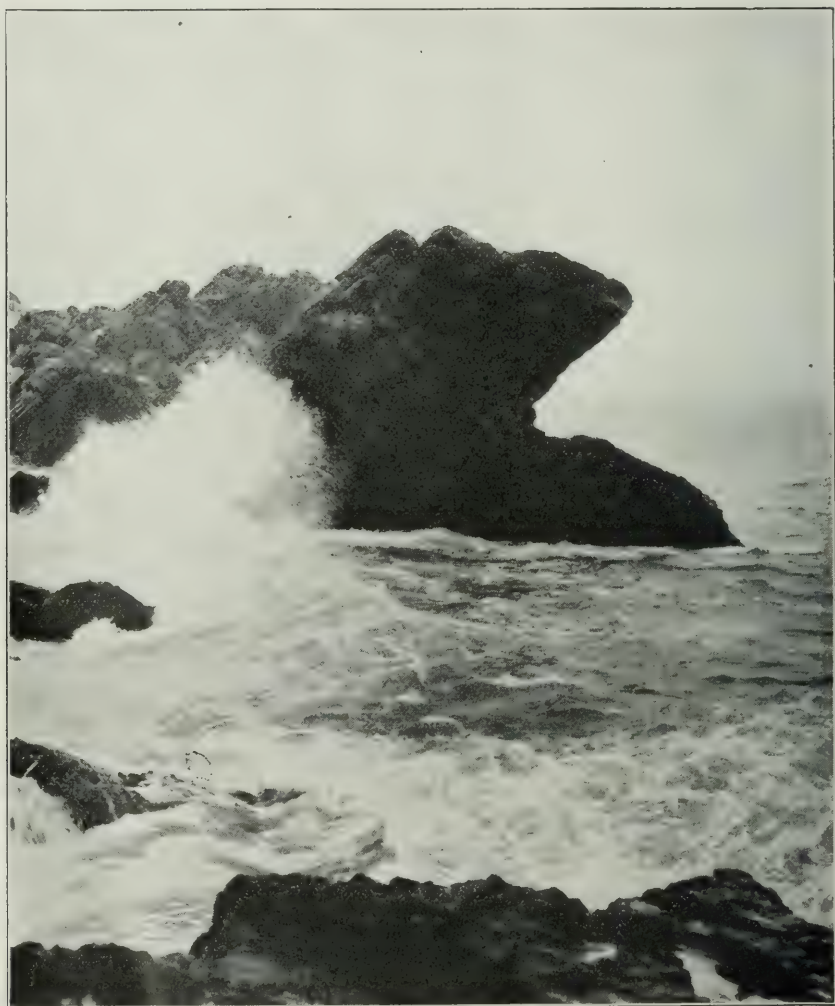
Did you ever think how much work the ocean is doing? If you have ever visited the ocean you know that it is never quiet. The waves are always beating against the shore and sometimes it seems as if they would wash the solid land away.

The ocean is doing different kinds of work. It is like a great animal that men have harnessed. When it is in a pleasant mood it carries the ships safely upon long voyages. When it is angry it often hurls the ships against the hard rocks and breaks them in pieces.

In many places the waves of the ocean are slowly tearing down the land. In other places they are building up the land.

The picture on the next page shows a rough and rocky part of the coast. The waves whiten the ocean with foam as they dash against the cliffs. Here we can easily see that they are doing work. With every storm the waves tear away a little of the land. They are digging holes and caves. We can see them in the picture.

Where the rock is soft the waves work faster



Courtesy Boston and Maine R. R.

"PULPIT ROCK," NAHANT, A SCENE ON THE COAST OF MASSACHUSETTS

and soon make a little bay. The hard rocks wear away slowly and after a time they form points of land sticking out into the water. Sometimes the waves wash around these points of land and make islands of them. Many of the little islands along the coast have been made in this way.



Courtesy of the Seattle Chamber of Commerce

SECTION OF THE RUGGED SHORE LINE OF THE STATE OF WASHINGTON

How do the waves work? Have they any tools? Let us see. If we walk along the base of the cliff at low tide we find the shore strewn with rounded pebbles. As each wave breaks and rolls back into the ocean we hear the pebbles grinding upon each other.

When the tide comes in and the waves again

reach the cliffs they pick up the pebbles and hurl them against the rocky banks. They keep doing this day after day, and do you wonder that at last they make hollows and caves in the solid rock?

The larger pieces of rock, which are broken from the cliffs, the waves leave upon the shore until they are smoothly rounded. The little pieces they carry far out, and, at last, where the water is quiet, let them sink to the bottom.

It is in the bay that the waves are making land. Some of the little particles of rock from the cliffs are washed into the bay. Others are brought by the river that enters the bay. The waves make a smooth beach of the little grains of sand. It is a beach on which children delight to play.

The sand which the waves pile up along the shore protects the land. They can no longer get at it and tear it down.

QUESTIONS

Mention the different kinds of work the ocean is doing.

Where do the waves work the fastest?

What are the tools of the waves?

What makes the waves? Of what is the beach made?

Where is the waste put that the waves take from the cliffs?

What time of the year is the ocean the most stormy?

What does the wind do with the sand?

Tell how some of the little islands are made.

What other kinds of islands have you learned about?



A RIVER

HOW THE RIVER MADE THE VALLEY

The river has much other work to do besides turning water wheels.

The valley in which you live was made by the river. It did this by carrying away little by little the particles of rock and soil along its path. It has taken many years for the river to do the work. It has not finished its work yet.

Let us look at the river after a heavy rain.



THE WORK OF THE RILLS

How were the rills able to make these little channels in the rocks? Does this look like a dry or wet slope? If there had been grass upon the slope, do you suppose the rills could have done so much work?

The stream is yellow and muddy. It has almost overflowed its banks. Logs are floating by. Near us a tree has tipped into the river. The water has torn away the soil that held its roots.

Where does the river get the mud which makes it so dirty? We will take our umbrellas and go out while it is raining to a little ravine. In summer there is no water here. Now the bottom of the ravine is covered with a muddy torrent. The torrent is hastening on to add its share to the river.

Upon the sides of the ravine the water is at work. The slopes are just covered with tiny rills. Each rill is as muddy as it can be.

The raindrops when they strike the ground pick up little particles of sand and clay. The clay makes them dirty, but they do not care. The sand they cannot carry easily and so they drag it along the ground. When many drops have united in a rill they are strong enough to carry bigger things. Watch closely and you will see what is happening. The rill is cutting a tiny channel upon the hillside. Many rills are doing the same thing, and if you look about, you will see that the sides of the ravine are all furrowed in this way.

Thus the work of tearing down the land goes on. The torrent in the bottom of the ravine into

which the rills are flowing is hastening on to the river. There it will get rid of its load of mud and sand.



THE RIVER MADE THE VALLEY

It may be that so many creeks full of muddy water will be more than the river can take care of. The river cannot overflow its banks and do much harm when shut in between the hills. But when it reaches the lowland where it is bordered by a broad valley or plain it may form a flood.

At such times the people in the lowlands are afraid of the river. It may spread over their rich farms. Then they will have to leave with their



RIVER AT LOW WATER



cattle and goods. Perhaps their houses will be washed away.

The river flows more slowly when it spreads out. It cannot any longer carry all the mud and sand which the creeks and rills gave it. When the farmer comes back after the water has gone down he finds that it has left a layer of mud over everything. It is the mud brought by the river that makes the bottom lands so rich.

The river does not drop all of its load here. It carries much of the finer material into the lake or ocean into which it flows.

The river thus does work in carrying dirt from

one place to another. It is washing down the hills and filling up the lowlands.

We have now seen how much work the water can do in one storm. Do you wonder that it has done great things in thousands of years? It has cut cañons so deep that you can hardly see the bottom of them. It has worn down great mountains higher than any you have ever seen. It has left only little hills in the place of these great mountains.

QUESTIONS

Describe the brook or river after a hard rain.

Is the water doing any work?

Describe the work of the raindrops on a hillside.

Where will the soil wash away faster, in a grassy field or a plowed field?

Have you seen sand-bars in the river? Why did the water drop the sand there?

What time of the year is the river doing the most work?

Give the reasons for thinking that the river made the valley.

Where is the land flooded when the river is high?

When a pond of muddy water dries up, what do you find where the water stood?

Where does the river carry the dirt which the rills bring it?

When does the river do the most work, when it runs swiftly or slowly?

What have you seen the water do near your home?

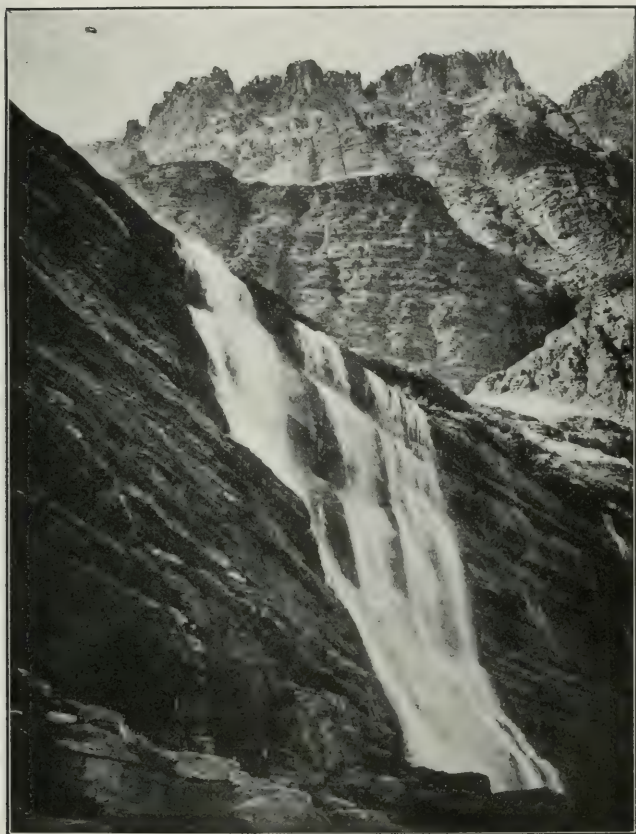
THE SUMMER STREAM

Let us visit the river upon a summer day. It is no longer a muddy torrent. In fact, the stream is so different that we hardly know it. The clear water ripples gently. We can see the sand and pebbles in the bottom. Little fish are darting here and there.

The river is doing no work now. The summer is its resting time. There are many kinds of pretty pebbles in the water. They are almost as round as marbles and very smooth.

Such interesting stories they can tell. Each little pebble has a different one. They were once pieces of rough rock in the mountains at the head of the river. One piece fell from a rocky cliff and rolled into a dashing stream. Another piece was picked up by a little boy and thrown into a cañon. A third came from a tunnel where miners were at work. It rolled down the mountain and into a creek.

As winter came the little streams in which the pieces of rock lay were turned into dashing torrents. The pieces were rolled over and over



MORNING EAGLE FALLS IN GLACIER NATIONAL PARK
Copyright, 1912, by Kiser Photo Co., for Great Northern R. R.

for many days, but when summer came the water went down and they rested for a while.

At last they reached the main river. They were much changed. Their corners were gone and they began to look like pebbles. Year after



THE SUMMER STREAM

year the pieces of rock became smoother, and one summer they were dropped where you saw them. Another winter they will again be moving down the river, rolling and tumbling along in the muddy water.

Place some bits of rocks in a dish and shake it for a few moments. You will find that the corners of the pieces have been rubbed off a little and that there is dust in the bottom.

Why is the river water so clear in the summer?



Courtesy Boston and Maine R. R.

A MOUNTAIN BROOK

We can find out by following the river to its head. The river divides into many little streams. At the head of each there are clear springs.

Spring water has come a long journey through the ground. It has lost all the mud which it had

when on the top of the ground. The spring is filtered rain water. If you turn muddy water into a filter it comes out clear. In the filter there is either sand or rock full of tiny holes. Passing through these the water loses its mud.

The river is muddy in the winter time, for then it gets the most of its water from the top of the ground. You know how dirty the ground is.

In some countries the rivers disappear in the summer. The thirsty air keeps taking the water as long as there is any in sight. If the river bed is sandy a part of the water escapes. It creeps in among the sand grains away from the sun and air. People obtain water from such a river by digging holes in the sand.

QUESTIONS

Describe the difference between the summer and winter stream.

How were pebbles made?

What did the river do with the material it ground from the pieces of rock?

What is sand made from? Tell how it is made.

Why is the water of the river clear in the summer time?

What makes some creeks dry in the summer?

What is a filter?

How do the springs act like filters?

Tell how the bed of a dry creek looks.

WHAT IS CLIMATE?

The climate of a place is the kind of weather which it has. If it rains much in a place we say the climate of that place is wet.

If the sun shines the most of the time and little rain falls, we say the place has a warm, dry climate. Nearly every place has a different climate. At my home it rains in the winter, and the summers are long and dry. Where you live it may snow or rain every month in the year.

Many things work together to make the climate of a place. The sun, the winds and the clouds are all striving with each other. The weather yesterday was not like the weather to-day. Winter is not like summer, nor spring like fall.

Summer is warmer than winter, because in the summer we get more sunshine. In the south it is warm nearly all of the year. In the far north there is little sunshine and it is cold the most of the year.

You will learn in the next lesson how the climate changes as you go up the side of a

mountain. On the top of the mountain it is much colder than in the valleys below. At the foot of the mountain it may be warm enough for oranges, while at the top there is snow the whole year through.

The sun warms the land quickly. The heat of the ocean changes but little from winter to summer. The winds which blow from the ocean are cool. For this reason people who live near the ocean have a pleasant summer climate.

In the summer the winds which blow over the land become warm. Upon the great plains these winds are so hot as to almost burn your face.

It generally rains more near the ocean than it does far away. Mountain ranges have more rain than lowlands, for their cool tops turn the clouds into rain. A country which has a high mountain range between it and the ocean gets very little rain. The mountain has taken the most of the moisture from the air.

A place where but little rain falls through the year is called a desert. The desert has strange looking plants which can live a long time without water.

The climate of a place determines what kind of plants can grow there. The climate also

affects the animals. There are some places upon the earth where people cannot live because of the bad climate.



PICKING PEARS, NEAR GLENDALE, CAL.

The kind of work which people carry on is partly determined by the climate. Everywhere you go you will find people raising different kinds of products and doing different things.

Oranges can grow only in a warm climate. We get apples and grain in cool climates.

In wet countries the forests are often so dense that you cannot go through them without having a path cut. In the desert there is little in sight besides sand and rocks.

The animals of the south have little fur. They are dressed by nature for the warm climate in which they live. In cold countries their fur is thick and long.

In cold climates we need meat to eat. Where it is warm fruits and vegetables are better for us. In every place people raise what will grow best in that place. The different climates give us a great variety of food.

If the climate were the same everywhere our world would not be as pleasant as it is.

QUESTIONS

Are the days cooler upon a hill or in a valley?

Why are the nights cooler?

From which direction do the winds blow that bring rain?

Where do you think it is warmer in the winter, near the ocean or far away from it? Why?

Mention the different things which make the climate of your home.

Do ponds and lakes freeze over in the winter where you live?

What time of the year does it storm most?

How do people keep warm where it is cold?

What do you eat that is raised in a warm climate?

WHAT WE LEARNED BY CLIMBING A MOUNTAIN

Mountains are higher than hills. We might call a mountain a grown-up hill. Mountains are also rougher than hills. They have rugged cliffs and deeper cañons.

We climbed a mountain once. Would you like to know what we saw?

We started from the valley where the land is smooth and the river flows slowly. All the land was covered with grain-fields and orchards. The people there are farmers.

As we traveled in the direction of the mountains the valley became narrower and the land not so smooth. We soon got among the foothills. These are little hills at the foot of the mountains.

We left the grain-fields behind, but there were still many orchards to be seen. After a time the hills became too rough and steep for the orchards and we saw about us herds of cattle feeding. Cattle can find something to eat where the land is too rough for the farmer.



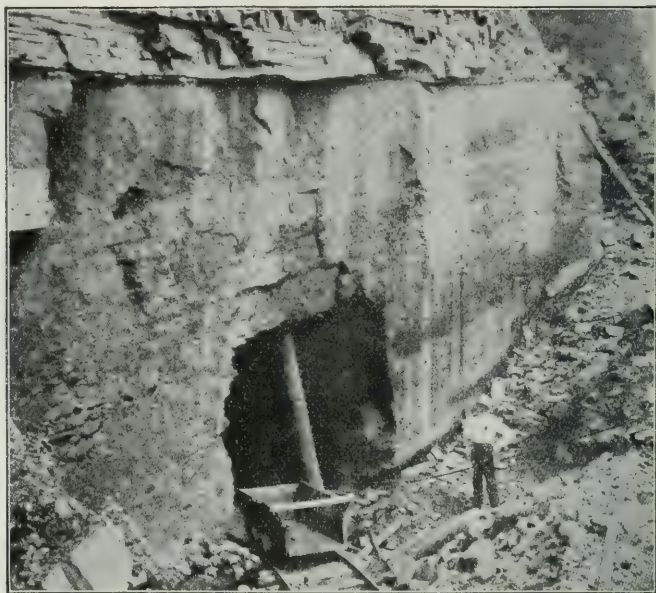
Courtesy of Denver Tourist and Publishing Bureau, Denver, Colorado
PETER PAN OF THE ROCKIES, ROCKY MOUNTAIN NATIONAL PARK, DENVER,
COLORADO

The river now flowed in a narrow valley or cañon. At one point there was a pretty waterfall. The river tumbled over a ledge of rock with a loud noise. The river has been at work for a long time digging the cañon in which it flows. Where the waterfall is, it found some very hard rock, so it jumped over a rock instead of cutting it away.

As we went up the mountain we found that the climate changed. We seemed in a strange country, for everything was different. In the valley the spring flowers had gone. Here they were thick on every side and there were many which we had never seen before. The days and nights were cooler. It seemed like spring. In truth it was spring, for winter lasts longer and spring comes later in the mountains than it does in the valley.

The trees as well as the plants interested us. There were pines and firs that filled the air with a pleasant odor. Where the rough bark was broken we found resinous sap. How sticky it was! That which had become dried made good chewing gum.

We passed by a mine where the men were digging deep in the rocks for gold. We saw the ore come up out of the mine and go to the



RUFFONER IRON MINE, ALABAMA

Showing entrance to mine where ore beds are exposed

stamp mill. Thump, thump, thump! went the iron stamps as they crushed the rocks and set free the gold.

By and by we came to a clear lake. There were forests and rocks around it. The water was so quiet that we could see everything on the shore reflected in it. We learned much from the lake, but you will hear about it in another chapter.

Up we went, for we were still far from the

top of the mountains. After a time the trees became smaller and at last we stood upon the bare, rocky slopes. Mosses grew upon many of the rocks and in warm nooks there were low bushes. The air was cooler than in the little valleys and along the brooks the spring grass had hardly begun to grow.

You would hardly have thought it was the month of July, for snowbanks lay here and there on the shady slopes. How strange to be able to play snowball in summer! How long and cold the winter must be there!

The climate there is much like that in the far north. The plants and animals that live there are similar to those of the north. In climbing the mountain we passed through regions of different climate and productions just as we would do in going from our own home toward the cold north. Does not this seem very strange to you?

At last we stood upon the summit of the mountains. It is so cold and barren there that nothing can grow. We were very tired, but the view which we got over many miles of country interested us for a long time. We played that it was a great map, and we enjoyed studying it much more than those in the geography.



THE MOUNTAIN SLOPES DOWN LIKE THE ROOF OF A HOUSE

The mountain slopes down like the roof of a house. We stood as it were on the ridge of the roof.

On the side of the mountain up which we had climbed, the water from the melting snow and the springs, after a long journey, goes down past our valley home. Upon the other side of the ridge, or summit of the mountain, the water flows down through another valley far away from ours.

We stood with one foot upon one slope and



Near the head of the river there is a pretty lake. What sort of slopes has the lake? What do you see in the lake?

one upon the other. The raindrops falling there start away in different directions.

How different their stories will be when they once more reach the ocean! They may never be near each other again.

The ridge on which we stand is called a divide, because it makes the water flow in opposite directions.

QUESTIONS

How are mountains different from hills?

What occupations do people follow in the valley?

What kinds of work are carried on in the mountains?

What is a waterfall?

Of what use are waterfalls?

Tell some of the ways in which pine trees differ from other trees.

Of what use to us is the sap of the pine?

Where does snow stay the longest?

Where is it cooler on a summer day, in a valley or on a hill?

Find a divide near your home and describe it.

How is the divide like the roof of a house?

How is going up a mountain like going toward the north?

Why do different plants grow at different heights on the mountain?

What climate do you like best?

Would you rather live in the valley or on the mountain? Why?



MT. WILBUR FROM THE SHORE OF LAKE McDERMOTT, GLACIER
NATIONAL PARK, MONTANA

STORY OF A MOUNTAIN

Before us rises a high mountain. Its sides are steep and rocky and very hard to climb. What made the mountain? Has it always been there, or is it a little hill grown large and high?

Mountains really do grow. Is that not strange? They were once lower than they are now. They began as little hills long ago and slowly kept getting larger. When mountains stop growing they do not remain always. They

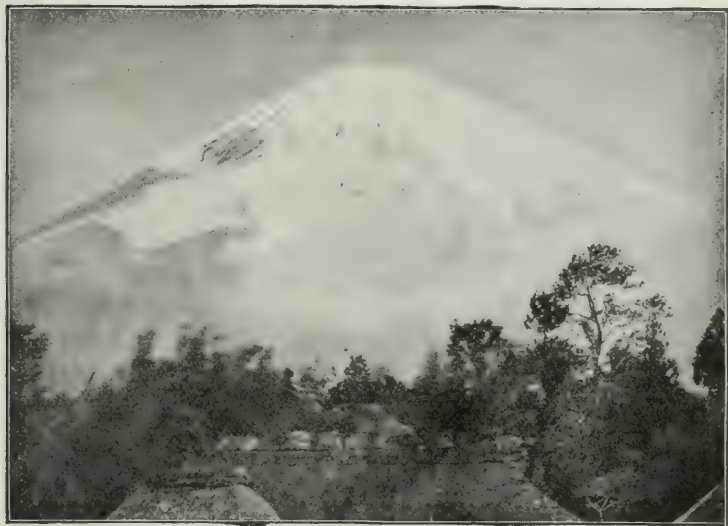
are wearing away, and after a long time may change to little hills again. Let us see if we can understand how this is done. A mountain will interest us more when we know its story.

Some mountains are formed by the rising of the solid land on which we live. The land wrinkles in furrows and ridges. You can see how this is done by taking a piece of paper in your hands: when the paper is stretched out it is even like a plain; shove the opposite edges of the paper towards each other and it will wrinkle. There will be a ridge, and then a hollow, and then a ridge again.

At first the ridges upon the earth where mountains are now forming are not higher than hills, but they keep rising and rising until they reach two or three miles into the sky.

You cannot see mountains grow, because they do so very slowly. You would have to watch many thousands of years to see one change a great deal.

You have all heard of earthquakes, I am sure. At such a time the land trembles under our feet. The strongest buildings are sometimes thrown down. In places where mountains are growing we often have earthquakes. In the western part of our country we can see places



FUJI YAMA, JAPAN

where the land has changed its level fifty feet at the time of an earthquake.

The mountain which rises so white in our picture is a volcano. It is one of the highest mountains in the world and is in Japan. Volcanoes are formed in a different manner from other mountains.

Have you ever heard what volcanoes are made of, and how they have buried whole cities? In Italy there is a volcano that buried two cities for so long a time that people living near forgot that the cities had ever been there.

Volcanoes are built of lava and ashes which



Courtesy Denver Tourist and Publicity Bureau, Denver, Colo.

LONG'S PEAK, WITH CHASM LAKE IN THE FOREGROUND, ROCKY MOUNTAIN
NATIONAL PARK, COLORADO

are thrown out of an opening in the earth. Far down beneath our feet the rocks are very hot. In some places they are hot enough to melt. If there is any water in them it is changed to steam. The steam tries to get out just as it tries to escape from the boiler of an engine. Where it finds a weak place in the crust of the earth it makes a hole. Around this opening a volcano may be built up. Melted rock, pieces of solid rock and ashes are blown out through the opening. After a time enough accumulates to form a mountain.

We have seen how the river is at work making the valley in which it flows. We have seen that mountains are furrowed with gulches and cañons made by the raindrops. The muddy streamlets after a rain are carrying the land away from the mountain sides.

Do you not think that after a long time many streamlets could wash the mountain entirely away? Every spring when the snow melts the streamlets are working as fast as they can carrying the particles of soil and rock down to the valley. Some time the mountain may be worn down and only a hill left in its place.



This is a mountain lake. What do you see around the lake? Point out the little stream flowing into the lake. Through what sort of land does it flow? Does it not look like a little grassy meadow? Why do you suppose it enters the lake through a point of land? The stream has brought down mud and sand, and slowly built the little meadow. This land, thus built out into the lake, we call a delta. By and by the stream will entirely fill the lake and turn it into a meadow.

SOMETHING ABOUT LAKES

You remember that in going up a mountain we passed a pretty lake. Would you not like to know something more about lakes?

You have all seen ponds left by the rain in

hollows of the land. Some of the boys have built rafts and paddled about on these ponds.

A lake is much like a pond only that it is larger. Different lakes have different stories to tell. All these stories are interesting and we will listen to some of them.

Our mountain lake was formed in a river valley. Below the valley the river flowed through a cañon with steep, high walls. The falling rain soaked into the cracks on the rocky bank until by and by the rocks were made so loose that they were ready to fall. One wet winter the whole hillside slid down and blocked the river. A great mass of rocks and dirt filled up the whole cañon.

The river kept flowing into the valley above and soon a large lake filled it. When the water of the lake reached the top of the dam the river flowed on again. It tumbled over the dam and went dashing down the cañon as if nothing had happened.

After a time the lake became very pretty. Willows and grasses grew about its shores, and many water animals came to make their homes there.

But the river was not idle. You know how it works a part of the year. It kept bringing



THE MEADOW TAKING THE PLACE OF THE LAKE

down mud and sand and pebbles, and had no place to leave them but in the lake. The upper end of the lake where the river flowed in began to fill up. At last a marsh took the place of this part of the lake, and then dry land covered with grasses. The land formed in this way we call a delta.

The lake will after a time disappear and a beautiful meadow fill the whole valley.

There are other kinds of lakes besides the one we have just learned about. The water in our mountain lake is fresh, and good to drink,

because it has an outlet. There are lakes with no outlets and these are often very salty. Besides the mud and sand which the streams bring into the lakes there is a small amount of salt, soda and other minerals. After a time the water becomes so salty that it is not fit to drink. In some places they make salt and soda from the water of such lakes.

Lakes are very pretty and many people camp by them in the summer. They are also useful, because they store the water of the winter storms which would otherwise run away to the ocean.

QUESTIONS

Tell what a pond is.

Have you ever seen a lake? If so, describe it.

Have you seen a landslide after a heavy rain? Tell what happened.

Why did the river leave its load in the lake?

Of what value are lakes?

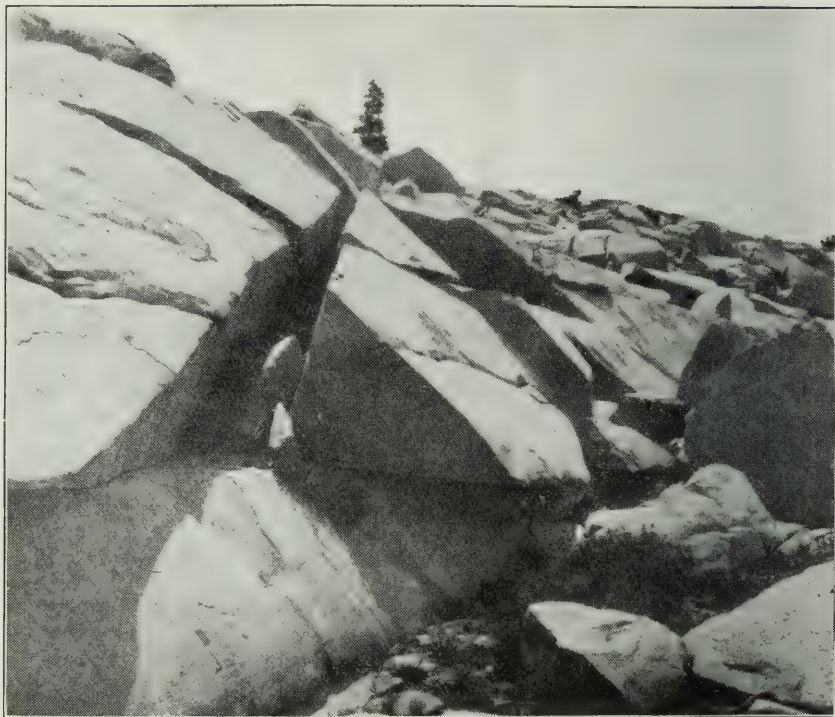
Why is the water salty in some lakes?

What is a meadow?

How does the ocean differ from a lake?

What is a delta?

Is the land formed by deposit from a river rich or poor?



WHERE WATER IS QUARRYING ROCK

Nature is breaking these granite rocks in pieces. How does she quarry out these great pieces so that they can slowly crumble to make soil? Jack Frost is doing the work. The water soaks into the tiny cracks. In the winter it freezes. The ice opens the crack a little wider. By and by the pieces are pushed apart as you see in this picture.

WHAT ROCKS ARE MADE OF

We have learned that soil is made from rock. Now we ought to learn something about rocks themselves. Rocks are very useful in many ways. It is in the rocks that we find gold and other minerals.



A QUARRY

We have seen rocks in many places. In the hills and mountains they are sticking out of the ground. Along the ocean shore and in the cañon the waters have washed the soil away and left them bare.

Do you know what a quarry is? It is a place where rock is obtained for buildings. The rock which we find on the top of the ground is dirty and often crumbles easily. It is changing to soil. To get clean, hard rock men open a quarry.

To do this they first scrape away the soil. Then they use powder and blast the rock out until they get down where it is fresh. Then care is used, in breaking the rock, to get pieces the right size. After the rock is broken, hammers and chisels are used by the men, to shape the pieces as they wish.

Many kinds of rock are used for buildings. Granite will be the most interesting to us, and so we will study a chip of that rock.

Here is a piece of granite just from the quarry. I am sure that we have all seen granite. The piece is speckled with little grains of different color. Let us see what these grains are:

Here is one that is clear and looks like a piece of glass. It is so hard that you cannot scratch it with a knife. This mineral is called quartz.

There are also some little black grains in our chip of granite. If we examine them carefully we find that they can be split into thin scales which are elastic. This mineral is mica.

There is another mineral in granite. It has a light color, but is not glassy like quartz. It shows bright shining faces. This mineral is called feldspar.

Take a hammer and pound a piece of

granite until you have a fine powder. Wash away the dust and mica scales and you will have some clean white sand like that upon the beach.

Nature is breaking the rocks in pieces, but she works quite differently. She takes a long time to make a piece of granite crumble to sand.



GRANITE CRUMBLING TO SAND

The sand which you will find by the water's edge is mostly grains of quartz. Quartz is used for making glass.

You will find mica in the brooks in the summer time. When the water is clear you can see the shining mica scales moving along the bottom with the current. They look like gold.

Scales of mica are used to make the windows of stoves. These scales are very much larger than those found in granite. Can you

think why glass would not do for stove windows?

The feldspar in granite finally turns to clay. It is clay that sticks to our feet when it rains. Our china dishes are made from clay.

Bricks are made from sand and clay mixed.

When grains of sand become cemented so as to stick tightly together they form a kind of rock called sandstone. This rock is also used for buildings.

Limestone is still another kind of rock. You can tell limestone because it is quite soft, and when you put drops of an acid upon it little bubbles quickly form. Marble is one kind of limestone. It is used for statues.

QUESTIONS

Tell some of the ways in which rocks are useful to us?

Why do men dig deep in the earth to get rock for buildings?

How is the soil made from rock?

Where have you seen rock?

Can you tell how men quarry rock?

Mention some of the uses of glass?

What uses are made of marble?

Can you tell what mortar is made of?

What part of granite makes clay? Give some of the uses of clay.

Can you tell us something about mica?

Tell us about the different kinds of rock used for buildings.

Which is the prettiest? Which is the softest?

How can you tell quartz when you examine a piece of granite?

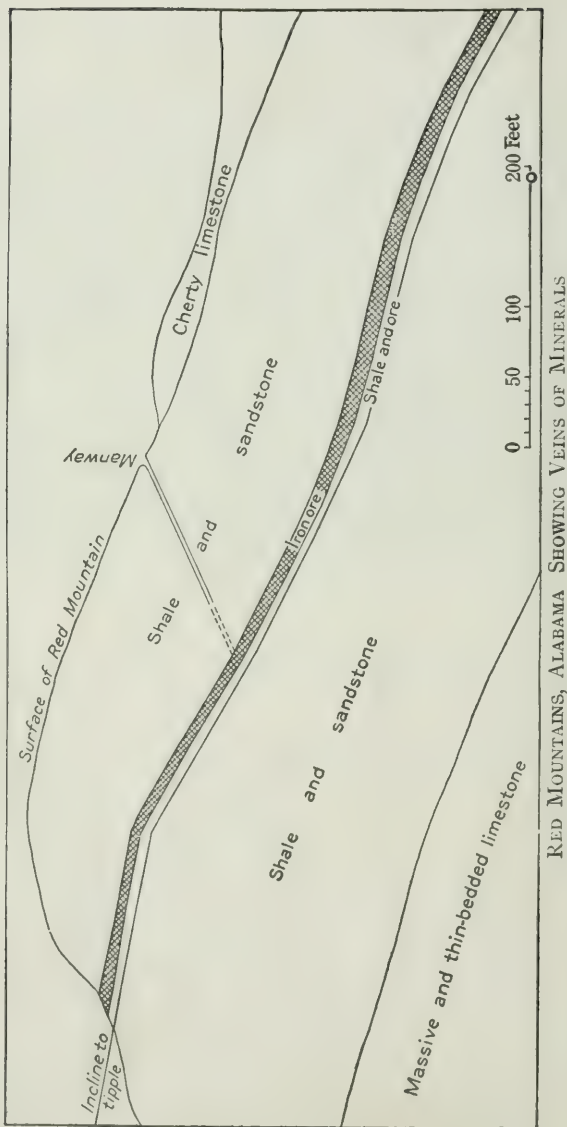


VIRGINIA CITY

WHERE MINERALS ARE FOUND

What minerals have you seen? Let us think. There is iron, which is used to make our stoves. Tin is used to coat many of our dishes. Copper is used in making wire and in many other ways. Gold and silver are used for money. They are also used in making dishes and jewelry.

There are so many different minerals. Where do you suppose they are all found? We cannot go out in the hills and pick these minerals up in



RED MOUNTAINS, ALABAMA SHOWING VEINS OF MINERALS

the form in which we see them. They are rough and dirty, and mixed with rock when first found. They have to go through many processes before they come out pure and bright.

If you were hunting for gold or silver, would you look in the valleys where grain and fruit are raised, or would you go into the mountains?

Minerals come out of the earth, but they are not often found in the soil. We would not be apt to find them in the garden or grain-field. Minerals come from the hard rocks in the mountains.

In the valleys the rocks are buried by the soil. In the mountains the rain has washed the soil away from the rocks, leaving them quite bare in many places. This is where we should go to hunt for minerals.

Here is a man who can tell us something about minerals. He has spent many years hunting for them, and digging among the rocks. He is called a miner.

He says that minerals are found in thin layers in the rocks. These layers or veins reach ever so deeply into the earth. Hundreds and hundreds of feet the miner digs down through the rocks as he follows a little vein of ore. He



LOOSENING COAL—WITH WEDGE AND SLEDGE

gets far from the light of day and has to use a candle to work by.

The holes which the miner digs are called shafts. They appear very much like wells. The miners ride up and down in what is called a

cage. The cage looks like the elevators found in tall buildings in cities.

Mining is dangerous work. Sometimes the miners do not have good air to breathe. They are often hurt by falling rocks or by powder explosions.

Some mines have been dug nearly a mile deep. Would it not seem strange to ride down nearly a mile into solid earth? The deep mines are often very hot. The men can stay in some of them only a little while at a time.

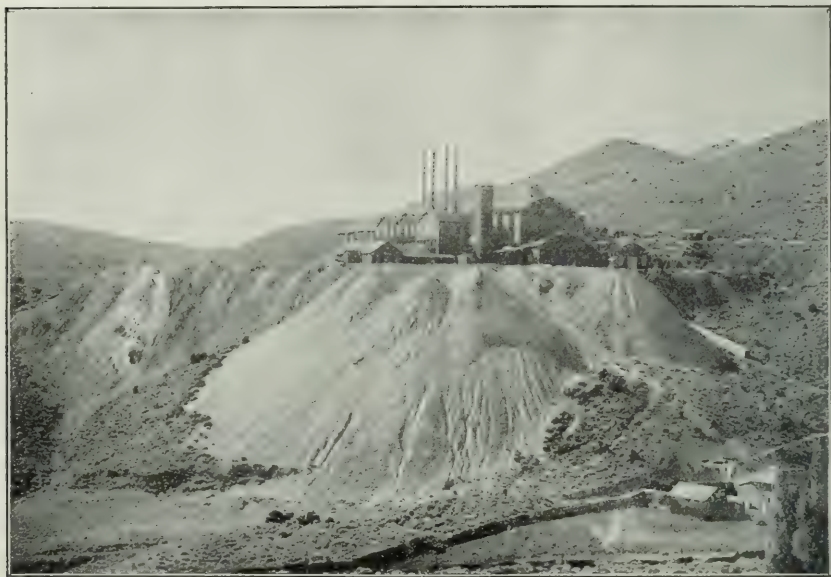
There is much water in most deep mines. We have learned that there are little underground streams running through the cracks in the rocks. The shafts and tunnels cut some of these, and this is the reason the mines are so wet.

It is hard and dangerous work to get the shining yellow gold. Men go all over the world hunting for it. What an interesting story gold might tell us—a story of how it was buried deep in the earth ever so long ago, and how the miners found it and brought it to the surface.

To get the gold from the rock sticking to it the ore is put in a mill. The mill is a noisy place with heavy stamps of iron rising and falling all of the time. The stamps crush the rock

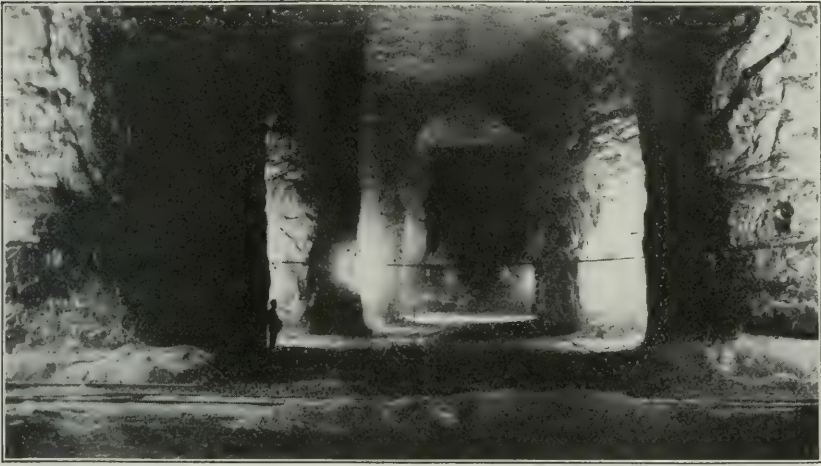
and set the gold free. At last it comes out clean and bright.

Most of the mines are found in mountainous countries. If you will look upon the map of



A GOLD MINE

your country or state you can tell where the mines are. You can imagine that in each mountain range which you see pictured upon the map there are hundreds of little holes. You can imagine also that these little holes are full of busy men. They are going in and out of the holes like so many busy ants, digging long



SALT MINE, INTERIOR, AVERY ISLAND, NEAR NEW ORLEANS

underground passages and bringing the rock to the surface.

QUESTIONS

Mention the different minerals which you have seen.

Which is the most valuable?

Which is the heaviest?

If there are mines near your home, tell what you have seen men doing there.

If you were looking for minerals, where would you go? Why?

Are there minerals underneath the soil of the valleys?

Why do not men mine in the valleys?

In what way is mining dangerous?

What is the most useful mineral?

Why are some mines hot?

How deep have men been in the earth?

Give some of the qualities of gold.



Courtesy New Orleans Chamber of Commerce

TARPON CAUGHT IN THE MISSISSIPPI SOUND, NEAR NEW ORLEANS

THE INHABITANTS OF THE WATER

The water is full of living things. Watch the water of some quiet pond and you will see many sorts of animals. They are moving about looking for something to eat.

The most of the animals that you find in the water spend all of their lives there. Some of them are fitted to live upon the land also. These go back and forth as they please.

The land animals have legs for walking and lungs for breathing air. The water animals swim or float or creep upon the bottom. Some remain fastened in one place the whole of their

lives like plants. Instead of lungs they have gills for breathing water.

We find many kinds of plants growing in the water. Those in the shallow ponds and lakes, whose roots reach into the mud and whose leaves and flowers are found on the surface of the water, were once land plants.

Besides these we find another class of plants called algæ or seaweeds. These are very different from the plants which we have just mentioned. Their home has always been in the water.

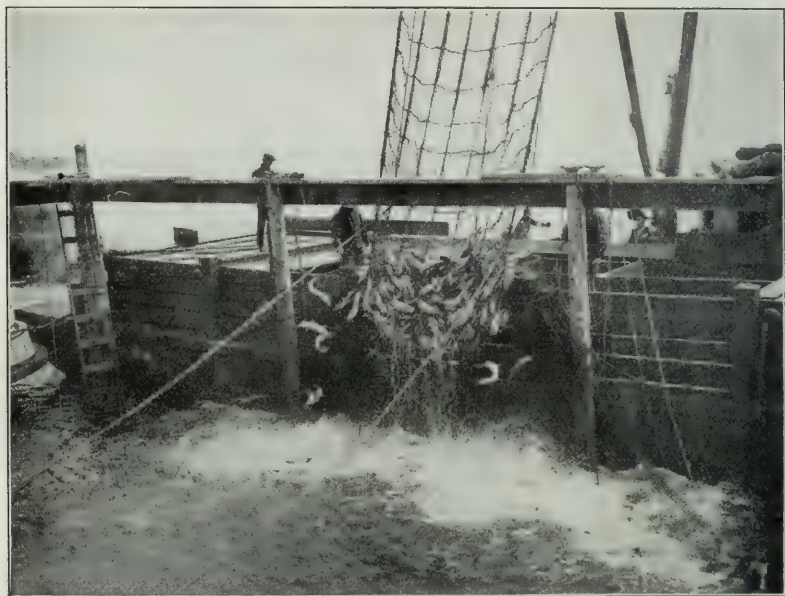
Some of them float in the water while others grow fastened to the bottom. They have no real roots, but take their food from the water by means of their leaves.

If you could take a walk upon the bottom of the ocean it would seem like fairyland. Everything would be so strange and interesting.

We should see many fish and other animals, some very large and fearful to look at.

Nearly all the fish that you find in the ocean die if placed in fresh water. The grandfathers of the fish which you catch in the brooks and lakes lived in the ocean a long time ago. Their children while hunting for food slowly became used to breathing fresh water. So at last they left the ocean and went up the rivers to live.

They found food which they liked in the rivers and they did as you will learn plants have done. They adapted themselves to all kinds of places.



Courtesy of the Seattle Chamber of Commerce

SALMON BEING BRAILED FROM A FISH TRAP

Here is one way they fish in Puget Sound. The fish industry is one of the most important of the Puget Sound country and Alaska.

These fishes have lived in fresh water so long that now salt water will kill them.

You have all heard of the salmon. It can live in both fresh and salt water. This fish spends the most of its time in the ocean.



PREPARING FOR THE OPENING OF THE FISHING SEASON IN THE
COLUMBIA RIVER, NEAR ASTORIA, OREGON

When its eggs are ready to be laid it seeks a stream of fresh water.

For days the streams along the north Pacific Ocean are filled with salmon. They are crowding and pushing their way up stream. Those that are not killed at last reach the clear cold brooks in the mountains and there lay their eggs.

Seals and whales are among the most interesting of the ocean animals. They are not fish, for they have to come to the surface of the water to breathe air.

What a strange story these animals can tell! Their grandfathers lived upon the land ever so

long ago. They had four legs and walked around like other animals. They used to go into the water for food and at last spent the most of their time there. Their bodies and legs became changed so that they could swim or paddle through the water. Now they are at home in the water and very quick and graceful in their movements. Have you ever seen a seal out of water and noticed how awkward it is? The beautiful fur coat of the seal is like the coats its grandfathers wore when they lived upon the land. The face of the seal is very different from that of the fish. It is much more intelligent.

If you live near the ocean you have enjoyed playing along the shore at low tide. What have you discovered about the inhabitants of the ocean?

QUESTIONS

How do water animals differ from land animals?

Do you know any animals that spend a part of their time in the water and part on the land?

How do animals move through the water?

How does the covering of fish differ from that of seals?

Mention some of the fish that are found in fresh water.

Mention the different kinds of water animals that you know.

Tell what you know about the salmon.

Why did the fish in the ocean go into fresh water?

Mention different kinds of water animals that are used for food.

THE SPROUTING SEED



Here is a horse-chestnut. How smooth and bright it is! Upon the outside there is a hard, brown shell. The white substance within looks much like the meat of a chestnut.

We will partly cover one of the nuts with moist soil, and water it often. We may learn something interesting.

You know that the tree grows from the little seed. Do you suppose there is a tiny plant wrapped up in the horse-chestnut? If there is one it must be asleep. Perhaps the warm moist soil will wake it up.

Very soon the nut begins to swell. It is taking in water from the soil. Upon one side of the nut there are two little hollows coming together like the letter V. As the swelling goes on, the part of the shell within the V begins to split away from the rest of the shell.

It takes several days for this to happen, but at last we can see why it is. There in the opening appears a slender shoot. It is splitting the shell apart and forcing its way out.

There must be something within the nut waking to life, for day by day the little stem reaches farther out. The stem is turning down also as if it were trying to reach the soil.

The nut has swollen so much now that it has split the shell. Within we can see the white meat of the nut. It splits easily into two parts. The little stem which is pushing its way out is also splitting.

Between the two halves of the stem we now get sight of something new. It is the most wonderful of all. There are some little leaves unfolding. In a few more days they have opened. They are very delicate and tender, but just like the leaves of the horse-chestnut tree from which the nut came.

The end of the little stem has reached the ground and is pushing down into it. The stem is to be the root of the little plant. Branching rootlets are already starting from it.

But how can the plant grow before it has any roots? It is being fed from the white material within the nut. This is mostly starch. It is just what the little plant needs before it can shift for itself. The two halves of the nut which we have discovered are the seed leaves. After a time the plants will use up all of the food stored in

them. They will be of no more use and will shrivel and die.

By this time the little root has gone far down into the ground. The branching rootlets are growing. The leaves are now large enough to help. There are more of them and they are reaching up into the air. The roots take the food from the soil. This food passes up through the stem to the leaves. The sun shines upon the leaves and changes the food in such a way that the plant can use it.

QUESTIONS

Plant some beans and see if they behave as did the horse-chestnut.
What is the use of the hard shell on the horse-chestnut?

Mention some other seeds which have a shell on them. What are nuts?

Can you tell where the water soaks into the horse-chestnuts?

Of what use is the meat in nuts? What nuts have you eaten?

What would happen if the little stem which pushes out of the shell did not get down into the soil?

What are the two halves of the nut called?

Could you see the plant in the nut before it was put in the moist ground?

Do nuts have a covering? Are any of the coverings of nuts prickly?

What is it that makes the little leaves turn green?

Would the little plant grow without any sunlight?



WHERE FLOWERS GROW

Is there a girl or boy who does not know where to look for the wild flowers? Children have bright eyes. They did not learn from books, but Nature taught them. She showed them where to look in the meadow, and by the brook.

They have found that each flower has its own time for blossoming. Some plants love the bright sun. Others hide away where there is always shade. Some love the dry hillsides. Some can live only where their roots reach the water of the pond or brook.

Day after day there are beautiful flowers upon the teacher's desk. The children will tell you where each kind came from.



POPPY BED, EXPOSITION PARK, LOS ANGELES, CALIFORNIA

The buttercup, the orange poppy and the yellow violet came from the meadow. The prettiest flower of them all is the butterfly lily. It came from a dry hillside where you would hardly think anything could grow.

The purple trillium grew in the shady woods. It is one of the earliest of the spring flowers. The marsh marigold and Jack-in-the-pulpit are dwellers of the wet places. The grasses and cat-tails came from the quiet pond.

The pond lily loves the still water of the pond or river. Its great leaves and beautiful flowers cover the water. Pond lilies are hard to get without a raft or boat, but we prize them the more for this.

Study some of the little flower buds and you will see how delicately the petals are wrapped. Some flowers unfold with the morning sun, others wait until evening.

The plant loves its home just as you do yours. Away from its home the plant does not grow well. It is not happy.

How do you suppose there came to be so many different plants, each kind having a place of its own in which it loves to grow?

I will tell you the reason. I am sure you can understand it. We have already found that



WILD PHLOX GROWING AMONG THE ROCKS

plants want good soil, water and light. Whenever it rains we find the ground covered with little plants. Each is struggling to get sunshine and food. There is not room enough for all of them in the best places. Many are crowded out and have to live where the ground is dry and barren. Some, like the pond lily, are crowded into the water.

At first this was pretty hard for them and ever so many died. After a long time, however, the plants became used to their different homes.

They became so contented that they wanted to stay where they were. They would not be happy if they had to go back to their old homes.



MORNING GLORIES

Out on the meadow you can see how the plants are still crowding each other. Each plant

is striving to get all the sunshine, and plenty of room for its tiny roots. The plants next to it are doing the same thing. The strongest succeed, but the weak ones finally droop and die. Some time you will want to know more about how plants as well as animals are struggling. It is a strange story.

The flowers in our garden once grew wild. Our grandfathers dug them up and set them in gardens. They tended these plants very carefully for years, giving them plenty of water and soft rich earth for their roots. This made the flowers larger and more beautiful. The many kinds of roses have grown from the wild rose of the woods.

QUESTIONS

- Mention some of the early spring flowers and tell where they grow.
If you take a plant from a sandy soil and place it in a clayey soil, will it grow as well?
Will a plant from a dry country grow where it is very wet?
Are there any places where you do not find plants growing?
What are the little plants struggling for?
Of what use are the flowers upon the plants?
What is necessary to make the little seed sprout?
How do some plants scatter their seeds? Does the wind help?
Tell how our garden plants were obtained.
What plant turns its blossoms toward the sun?
How do some plants hold themselves against walls?



LIVE OAK

SOME COMMON TREES

We could not do without the trees. Not only are they very useful, but they help make the world a beautiful home for us.

Trees furnish us food in the shape of fruit and nuts. Their trunks are made into lumber for our houses. Paper is made from certain kinds, and the bark of others is of great value for tanning leather and in the manufacture of cork.

Where the trees are thick they form a forest.



PINE FOREST

Many animals make their homes in the forests, and birds build their nests there.

How we enjoy the shade of the trees on a warm day! The cattle and sheep are also found there contentedly chewing their cuds.

There are many reasons why we should preserve the trees. They protect the ground from the hot sun. The leaves and moss which are found under them hold the rain-water so that it does not run away so quickly. Where there is no vegetation the water runs rapidly away, cutting little gullies and carrying off the soil.

Trees which keep their leaves through the year are said to be evergreen. The pines and firs and cedars, as well as the live oak, are evergreen. How fragrant a forest of such trees is!

The pine loves the sandy soil and the rocky mountain slopes. From the sap of the pine we get resin and turpentine.

Most trees drop their leaves in the fall. At the base of the leaf stem there is a little bud. It is well wrapped up and protected from the wet and cold. The warm sun of spring makes the buds begin to swell. Soon they burst their wrappings and the bare trees are covered with green again.

Trees are suited to different places. This

came about just as you remember I told you it did with the flowers. The willow loves the wet places. It does not care much where it grows if only it has plenty of water. Wherever you find willows growing you may be sure there is water.

In the northern woods there are the birch and maple. The bark of the birch is used by the Indians for making canoes. The maple is an old friend. You have heard how maple sugar is made from its sap.

The fruit trees of our gardens were once wild. Did you ever find apple trees in the woods? Their apples are small and sour. Apple trees have been grown in gardens for many years. This has made the apples larger and more pleasant to the taste. The nut trees are a great attraction in the fall. Children who have never been nutting do not know what fun it is.

QUESTIONS

Mention some of the trees that drop their leaves in the fall.

What trees have leaves all of the time? Describe those of the pine.

In what kind of a covering do the seeds of the pine grow?

Mention some trees that grow upon dry ground. Some that grow upon wet ground.

Name a number of fruit trees. Of what use are trees? What is a forest? How do forests protect the soil? What effect has the rain upon countries where there is little vegetation covering the ground?



THE MOCKING BIRD—THE FARMER'S BEST FRIEND

SOMETHING ABOUT THE BIRDS

If birds could talk what stories we might hear. We might learn of a time, ever so long ago, when their grandfathers were not birds at all. Then they could not fly, for they had neither wings nor feathers. These grandfathers of our birds had four legs, a long tail and jaws with teeth. After a time feathers grew upon their bodies and their front legs became changed for flying. These were strange looking creatures. There are none living like them now.

All about us now are pretty birds. They wake us in the morning with their music. We think sometimes that they eat too much of our fruit, but then, if there were no birds to kill the worms upon the trees we might have less fruit still.

Each kind of bird is fitted for the place in which we find it. Some birds are fitted for life upon the water. Others do not fly much, but spend their time upon the ground, while still others are on the wing much of the time and have their nests in tall trees.

The duck lives upon the water. It has strong legs and feet with webs between the toes for paddling.

The stork is a wading bird, hunting for its food in shallow ponds. It has long legs which fit it for wading. In the water it finds insects and little fish, the kinds of food which it loves best.

The hawk has very sharp eyes. As it sails through the sky it is on the watch for a mouse or perhaps a tender chicken. It has sharp talons for catching and holding its food.

How delicate are the feet and legs of the robin. They are so small that it seems as if they could hardly hold up the body of the bird. The



The ostrich is valuable for its feathers. These are plucked at certain times without hurting the birds much. Do you think these birds can fly? What are their long legs for?

robin does but little walking. That is the reason his legs are so small.

The ostrich has such small wings that it cannot fly. This bird has, however, very large legs with which it can run rapidly over the ground.

Each kind of bird builds a different nest, and has a place of its own for its nest. The humming bird builds one of the softest down,



The sea gull is a very neat looking bird. Where does he live?

upon a swinging branch. The swallow builds its nest of mud, under some protecting roof or rocky cliff. Some birds take no pains with their nests. They gather a few sticks and leaves for a rude nest, or even lay their eggs in some hollow in the rocks.

We should not wantonly kill the birds and rob their nests. The birds are happy in their lives as you are in yours. They make us happy, too, with their songs, and eat many worms and insects which injure our fruit.



SEA GULLS ALONG THE COAST

QUESTIONS

Tell how birds differ from other animals.

What birds are used for food?

What birds have been domesticated? What are the names of some of these birds?

Do you suppose our hens used to be able to fly long distances?

Do you know any birds that make their nests on the ground?

Why do many birds make their nests in trees?

Name some of the song birds.

Where does the woodpecker get his food?

Mention some water birds.

Why do birds go north in the spring and south in the fall?



YOUNG VIRGINIA DEER

SOMETHING ABOUT THE WILD ANIMALS

Animals are not at all like plants. The plant spends its whole life in the spot where it sprouted from the seed. Its roots hold it firmly in one place. The soil may be poor and the leaves of the plant may get little sunshine, but it cannot help itself.

Animals go from one place to another for their food. They live where they can find plenty to eat and are well protected from their enemies.

Plants take their food in through their roots. They breathe by means of their leaves. Animals

have a mouth for eating. They breathe with lungs.

Some of the animals get their food from plants. Such animals have flat teeth for grinding this food. Many animals live upon other ani-



Fox

mals which they can catch and kill. They have sharp teeth for tearing flesh.

If you study the animals you will find that each one is fitted for the place in which you find it. There is a struggle among animals for food just as there is among plants. The weaker ani-

mals choose their homes where they can be safest from the attacks of the stronger ones. Because of these things many animals have come to live in the ground, and others in the trees.

The little mole, who spends all of his time in the ground, has a nose for digging in the dirt. It is dark there and he has no use for his eyes. Now he is almost blind, but his grandfathers a



THE TAME COYOTE

long time ago lived upon the top of the ground and had as good eyes as any animal.

The coyote lives in the open plain or hilly

country. He has use for sharp eyes and ears and long slender legs. He has a sneaking look and such a funny bark at night and morning. His safety is in being able to run fast. He is fond of rabbits and chickens. The coyote is very cunning and if you are looking for him you will seldom see him.

The rabbit is a timid little animal. His home is in the bushes. He has to look out for the larger animals who would eat him if they could. His long ears are very useful, and he can run, too, when he tries.

There are many kinds of squirrels. Some eat nuts and make their homes in trees. There they are safe except from the thoughtless boy with his gun. How gracefully they run up and down the trees and jump from branch to branch.

The ground squirrel does not care for trees. His food is in the grainfields, and to get a safe home he burrows in the ground. Like the gophers and prairie-dogs, a number of ground squirrels form a colony and live in a little village together.

In places their holes are so thick that it is dangerous to ride over the ground on horseback. How straight they sit up in front of their holes! When alarmed they drop out of sight with a quick whistle.



SQUIRRELS AT HOME

Landseer

Have you ever seen a wildcat? This animal is much larger than the house cat. It has a yellowish color and short tail. Perhaps you have seen little kittens spit and scratch. Before they have been handled much they act as the wild kittens do. The wildcat cannot run like the coyote, but it will fight more for its protection. It, too, is fond of rabbits and chickens.

There are many animals that have been hunted so much they are seldom seen. Among these is the bear. We find it now only in the wildest places where few people go.

In the fall we may see them around the berry patches. The bears love blackberries and huckleberries as well as manzanita berries and hazel nuts. The bear sleeps through the winter. In the spring he comes out of his den thin and hungry.

How beautiful and graceful the deer are! They have good noses and slender legs. By these means they protect themselves from the most of the other animals except man.

Do you not think it is wrong to kill the deer for sport? They enjoy life as well as we do. They will soon be gone if we do not stop hunting them.



QUESTIONS

How do animals differ from plants?

Mention some plant eating animals. What animals eat meat?

What kind of teeth has the dog? What are his claws for?

Do you know any animals that eat both animal and plant food?

What kind of teeth do we have? What is our food?

Do you know any plants that live upon the juices of other plants?

Can you imagine why the mole lives in the ground?

What animals love grain? What ones eat nuts?

What ones have slender legs for running away from their enemies?

What kinds of food do bears like best?

Why is it that so many wild animals have disappeared?

How shall we protect the animals?

Do you not think the woods would be lonesome without any of the wild animals or birds?



NEST OF THE MARSH HAWK—ONE OF THE SEVEN EGGS JUST HATCHING

HOMES OF THE WILD CREATURES

Every animal lives where it can get the kind of food that it likes. Some animals stay near the same place the whole of their lives. They either store up food for the winter, or go to sleep in some protected place, and never wake until spring.

Other animals never have a home. They wander here and there in search of food. When winter comes they seek a warmer climate; in spring they return toward their summer feeding grounds.

Among the animals that never have permanent homes are the wild horses. They wander in bands

wherever there is grass and water; in winter they dig the snow away with their feet, and in this way reach the grass.

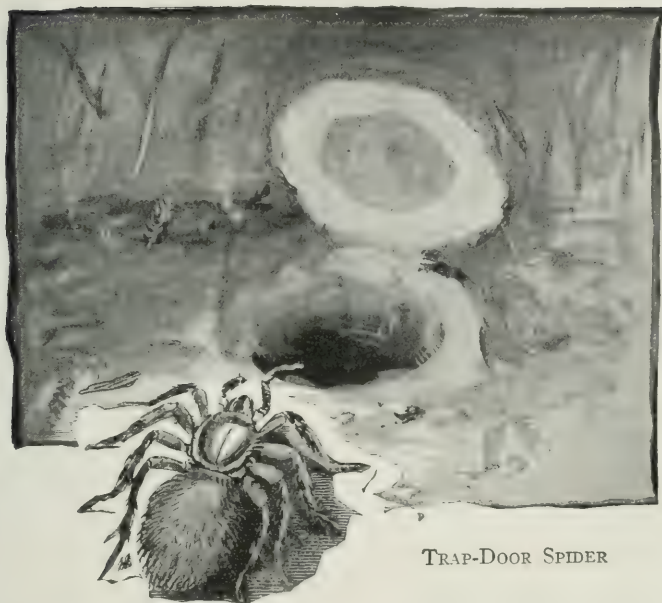
The little colts do not need a shelter. They can run and play when they are only two or three days old. Their mother is strong and watchful and can protect them from the coyotes and mountain lions.

The squirrel has a snug home in a hollow tree. In this he stores a supply of nuts for the winter. The little squirrels need protection and they are safe within the tree. If the supply of nuts is short they go to sleep until spring.

You have all seen the cozy nest of the mouse. The young mice are blind and helpless. They could not live without the protection of the soft nest so cunningly hidden away. Kittens and puppies also need a snug home for many days.

Some of the homes are so strange! The wood rat gathers a great pile of twigs under which his nest is made. The trap door spider lives in a little tube in the ground. The tube is about six inches long and has a trap door at the upper end. The door is strong and hinged so that when the spider goes home it will shut out the rain, and protect him from his enemies.

The ants build homes underground. They



TRAP-DOOR SPIDER

seem busy all of the time. The dirt which they take from the underground passage way is piled neatly around the door.

You will find the hermit crab among the rocks at low tide. He carries his home on his back. The home is not his own, but one he has stolen.

When he is in need of a new house he finds an empty turban shell or a periwinkle and crawls into it. If it fits, he stays there. How funny he looks as he runs around with the clumsy shell upon his back.

Each kind of bird makes a different nest.



The eagle's nest is a rude, coarse home for the little ones, but the humming bird's is of softest down.

When the little birds grow up they build nests just like those they were hatched in. The mother birds teach them in some way so that they never forget.

QUESTIONS

What is the use of a home?

Mention some animals that do not have homes?

Of what does the mouse build its nest?

Mention some animals that make their homes in the ground.

Mention some that make their homes under stones and logs.

What is the home of a bear called?

What does the bear do in the winter?

Where do birds go in the winter?

Are there any that stay with us through the winter?



HOME OF THE PUEBLO INDIANS

Seventy to eighty rooms on the ground floor.



A CARAVAN IN ONE OF THE DESERTS OF CHINA

Note that this is a camp where the men and camels are resting. Describe all that you see in the picture.

OUR HOMES

A long time ago people did not have beautiful homes. Then all the people on the earth were rude and savage. They wandered from place to place for food, and were like animals in many ways.

What sort of homes do you suppose these savage people had? They spent hardly as much time upon their shelters as the birds do upon their nests. Some of them lived in caves which they found in the rocks. Others built rude huts of bark or reeds to protect them from cold and rain.



Courtesy of the Denver and Rio Grande Railroad Company

The ruins of one of sixteen pueblos of Indians who are believed to have occupied these dwellings about 1000 years ago.



INDIAN HOME ON THE PLAINS

People chose places to live where they would be safe from the wild animals. They had also to defend themselves in their fights with each other.

Then hunting and fishing was the chief occu-



INDIAN HOMES

pation of the people, and they had to go where there was game to be found. When they discovered that they could raise grain and vegetables they did not move so much. Staying longer in one place they built better homes.

Everything is quite different now. A part



THATCHING A HOUSE WITH PALM LEAF MATS IN SOUTHERN NIGERIA

of the people upon the earth have become civilized. Many of us have never seen savages or Indians. We live in houses which have cost much money and work. Lumber and stone and iron are used.

We do not have to move from one place to another to get enough to eat. People who live far apart exchange goods with each other. Things which we need we go to the store and buy. We do not have to travel hundreds of miles to get them.



SUDANESE HUT

Of what materials is the home in the picture made? Do you think it rains little or much here?

We build our homes for protection from the weather. We fill them with all sorts of things. Some of these are to be used. Others are to make our homes beautiful. We do not fear wild animals now. We do not fear the attacks of savages.

Let us find out something more about the materials that our homes are made of. Where there are many trees sawmills are put up to cut the logs into boards. Where there are no sawmills the houses are made of logs. The roof is often made of the bark of trees.



Describe all that you see in this picture. Why do we think that this home is in the warm south?

Where there are no trees or lumber to be had, the houses are made of stone or adobe. There are many kinds of stone. It is quarried out of the earth.

Adobe bricks are made by mixing clay and chopped straw. This material is pressed into molds and then left in the sun to dry. The red bricks which you have seen are made by baking a mixture of sand and clay. The roofs of adobe houses are often made of brush on which mud is



ENCAMPMENT OF BLACKFEET INDIANS, GLACIER NATIONAL PARK

spread. This does not keep out the rain very well.

Did you ever see a sod house? Square pieces of grass sod are cut and piled up like bricks. A dugout is a house made partly in the ground.

What would you think of a house made of salt? Away in the desert of eastern California

there is a neat little cabin built of blocks of rock salt.



CABIN MADE OF ROCK SALT

The Indians of North America lived in wigwams, rude structures made of the skins of animals or of the barks of the trees of the forests.

In the far North the Eskimos in the winter build their homes of snow, as the best material to keep out the cold. In fact, climate and suitable material has, even in the most civilized countries, much to do with the style of building adopted. Flat roofs or no roofs at all are preferred in lands where no rain falls, as in parts of Egypt and India; slightly sloping roofs, where rain but no snow falls, and high pitched roofs,



ESKIMO IGLOO

to shed the snow, are common in all Northern lands.

QUESTIONS

- What kind of houses did people have a long time ago?
- Where did they select places for their homes?
- How did their homes differ from those of animals?
- Why do we build better houses to-day?
- Why do we not have to go here and there for food?
- Have you ever seen the home of an Indian? Of what was it made?
- Have you ever seen a log cabin? What is a dugout?
- Have you ever been in a cave? How would it do for a home?
- What is rock salt?
- Would a house of rock salt stand long where it rains much?



HOW PEOPLE USED TO TRAVEL

Our great-grandfathers did not have steamers, railroad cars, automobiles and aeroplanes to ride in. They had to depend upon their own feet or upon a small boat or upon the animals that they had taught to work for them. Cars and automobiles now carry us faster than the fastest horse. Aeroplanes make us companions of the birds. Can we ask for anything more?

It took our grandfathers many months to go from the East to California. The journey was very hard and full of danger. The oxen that pulled their wagons walked very slowly. They

found no bridges across the rivers. They had to hunt for water in the deserts. They had to struggle hard to get over the mountains.

Now we can go from the Atlantic Ocean to the Pacific Ocean in about four days upon the cars. We can make the journey in a day and a half in an aeroplane. Do you think we can ever go any quicker?

We have learned that a long, long time ago everybody lived in the way savages do to-day. They had not found out much about the world. They did not have the nice things that we have. They could not go very far from home because they always had to walk. When they came to a river or a lake they had to stop. If they fell in the water they were drowned.

Finally some of the brightest of these people who lived so long ago made a discovery. They learned what all boys now know who live near the water. They learned that the pieces of wood which they saw floating upon the water would hold them up. How glad they were to be able to cross the river by taking hold of a log and pushing it before them!

But a log did not satisfy them. Sometimes they lost their hold upon it and were drowned. In some rivers were crocodiles that ate them.

They soon learned to make canoes out of logs by building fires and burning out the inside of the logs. They could ride in the canoes and keep dry and safe. They could cross very wide rivers and even lakes. At first poles were used to push the canoes along, but those would not answer where the water was deep. So they used their hands for paddles and later learned to make paddles out of wood.

Canoes made it possible for these simple people who lived long ago to take long journeys upon the water. But they grew very tired paddling all day long. Then one of the brightest of them made a discovery. When he stood up in the canoe the wind helped it along faster than when he sat down. This made him think of putting up a piece of bark or matting between two sticks.

How happy he was to see the wind sending his canoe along faster than he could make it go by paddling! Savages do not like to work very hard and it was so nice to sit in the back of the canoe and do nothing but steer it with the paddle. Sometimes when the wind blew hard the canoe almost flew through the water

Have you ever seen the graceful canoe which the Indian makes to-day? Along the coast



A KIALAK

of Alaska the Indians hew their canoes out of cedar logs. Some of the war canoes are large enough to hold fifty people.

The Eskimos of the far north do not have wood for canoes. These people make their canoes out of skins of animals. The Chippewa Indians make their canoes out of the bark of the birch tree. Such canoes are light and pretty, but upset easily. They are so light that they can be carried on the back from one stream to another.

But canoes could not take these people of

long ago everywhere that they wished to go. They wanted to take journeys across the land. It was very tiresome carrying everything they had upon their backs when they moved their homes from one place to another.

In some parts of our world there were once wild horses and wild donkeys and wild camels. In other parts there are still to be found wild elephants, and wild cattle. The colts and calves of these animals were sometimes caught alive when the early people of whom we are speaking went hunting. These baby animals were brought home and grew up tame. Again some one, brighter than the others, thought of making use of these tame animals. So when they moved they tried placing small loads upon their backs. Then the children, who found it hard to walk long distances, were placed on their backs, and, finally, heavy loads. Our domestic animals are very intelligent and soon learned to carry these loads without any fuss.

Those people who lived in deserts discovered that the camel could go a long time without drinking. So this animal became very useful to them. The camel is used to-day in those lands where there are no roads or railroads. Camel caravans can now be seen crossing deserts where

no horse could go. The camel is perhaps the most useful of all the beasts of burden.

Wild or savage people in remote parts of the world still travel as they used to. Those who live upon islands or where there are many rivers and lakes travel by water. Those who live in dry lands depend entirely upon the animals they have tamed.

The canoes or boats of these people who lived long ago were small. They always tried to keep as near the shore as possible. They could not cross the wide and stormy ocean. How surprised they would be to see our great passenger steamers. These floating palaces have so many decks that there are elevators to carry us from one to another.

The animals which these people of long ago tamed and used to carry loads could not go over very high mountains. If they wanted to know what was on the other side they went around the mountains. We live in the same world that these people lived in, but we have learned more about it. We have around us the same air, the same water, the same mountains and the same deserts. We are no longer afraid of these things. We have learned to make them work for us.



THE BURRO IS USED FOR TRAVELING IN THE PUEBLOS

QUESTIONS

Describe any canoes that you have seen.

How does a row boat differ from a canoe?

What is a raft?

Mention the different materials out of which canoes and boats are made.

Tell about some bird or animal that has been tamed.

What is the fastest animal that has been tamed?

Why is a donkey safer in rough places than a horse?

What is the largest animal that has been tamed?

Where do the reindeer live and what do we use them for?

In what part of the world are dogs used to pull loads?



Official Photograph U. S. Army Air Service

THE "LOS ANGELES" FLYING OVER WASHINGTON

"The Rigid Airship"



A TRAIN DRAWN BY AN ELECTRIC LOCOMOTIVE ON THE NEW YORK, NEW HAVEN AND HARTFORD RAILROAD

HOW WE TRAVEL TODAY

We can travel now as far in a day as people once could in a whole year. Long ago there were only paths by which we could go from one place to another. Sometimes these paths were not much better than the paths made by the wild animals. They were often rough and steep and just wide enough for people or horses to walk in.

How dusty they became when it was dry and how muddy and slippery when it was wet. In those days people did not travel as much as they do now. They did not even know their neighbors very well. They did not know how large the world was. They could learn very little about those who lived in faraway places.

When some one learned how to make carts and wagons the paths had to be made wider. They had also to be smoother and less steep so that the horses, the mules or the oxen could pull the wagons when they were loaded.

When it rained the roads became very soft and the loaded wagons often stuck in the mud. To keep the wheels from sinking in the mud the drivers put small logs or rocks in the road. This taught people how to make the hard roads we have now. We spread a layer of crushed rock over the top of the road and roll it down hard and smooth. Roads over which many people travel are sprinkled to keep them from becoming dusty.

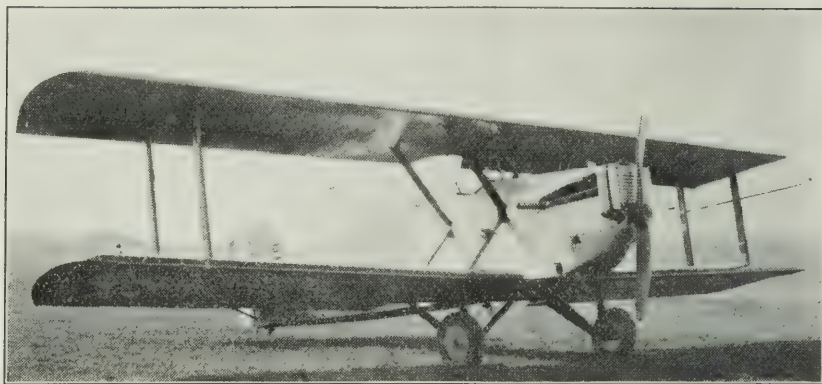
Finally some one discovered how to make steam work for us. The steam engine was put on wheels and these were fitted to iron rails so that loads could be pulled easier and faster than horses could pull them. We can now ride



AN OLD TIME STEAMBOAT LEAVING MOBILE FOR ALABAMA RIVER PORTS.
THE LAST OF A VANISHING CRAFT

across the country in a parlor car. We can eat and sleep there and be as comfortable as at home.

Then some one made a car that would run by steam upon a wagon road and without iron rails. Now automobiles, that are run by gasoline, carry us as fast as an express train over smooth hard roads. How astonished our grandfathers would be to see us travel thirty miles in



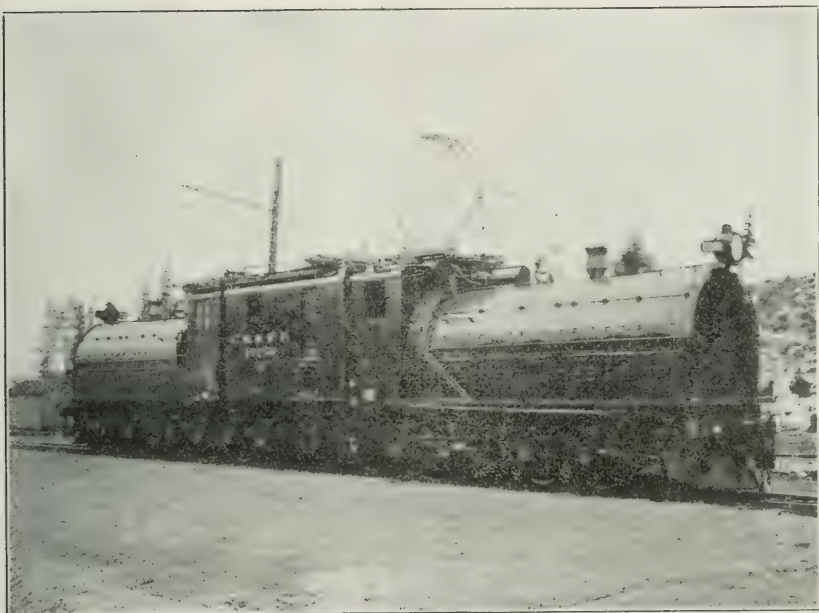
Official Photograph, U. S. Army Air Service

THE DOUGLAS WORLD CRUISER, THE AIRPLANE IN WHICH THE ROUND-THE-WORLD TRIP WAS MADE

an hour while it took them nearly all day to go the same distance.

We once used to stand and look at the graceful birds as they circled through the sky and wished we could fly as they did. They do not need paths or roads to travel upon. They do not need boats to carry them across the water. They can go anywhere they please.

Now our dream has come true. We have aeroplanes that fly like the birds. They have even gone around the world. We can now fly over the mountains as well as the birds can. We can fly over the forests and across the deserts where traveling was once so slow and difficult. We can easily visit people in any part of the



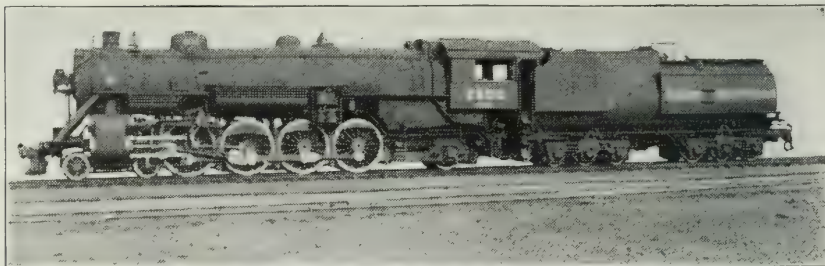
Courtesy of the Seattle Chamber of Commerce

AN ELECTRIC LOCOMOTIVE

The Cascade Mountains, near Seattle, produce great quantities of hydro-electric power, and this type of electric locomotive hauls big trains over the mountains.

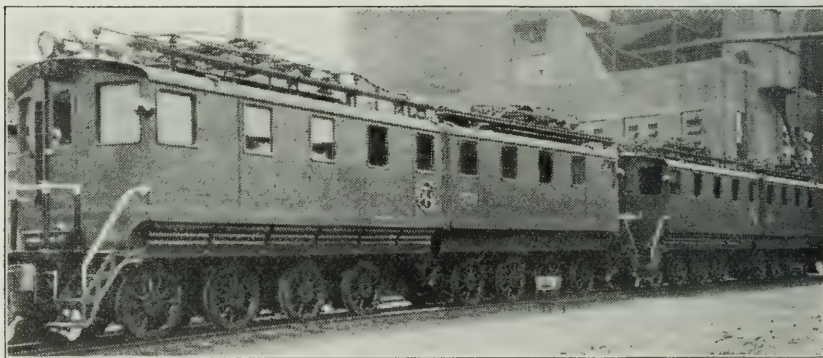
world. We can become acquainted with them and see how they live and what they do.

How much we have learned since our grandfather's time. People living on opposite sides of a mountain did not know each other. This sometimes made them enemies. Now they can get acquainted with each other and become friends. Railroads cross the deserts and bore through the mountains. Aeroplanes fly over the mountains.



Courtesy Baldwin Locomotive Works, Philadelphia, Pa.

MODERN LOCOMOTIVE



Courtesy Ford Motor Co.

ELECTRIC LOCOMOTIVE



Courtesy Great Northern R. R.

THE FIRST LOCOMOTIVE IN COMPARISON WITH A MODERN, OIL-BURNING
LOCOMOTIVE



But we cannot use these new ways of traveling everywhere. Let us go from the city to a mine in the high mountains. This journey will show us in how many different ways in different places people travel to-day. People who live in the mountains still travel as everybody did in the time of our grandfathers.

We will first take a steamer up the river that flows down through the valley. Our steamer does not mind the wind. It can go against a current of water. The steamer is a floating hotel. It carries everything we need.

We might have taken an aeroplane a part of

the way to the mines we went to visit. We could not have gone the whole distance in this way because an aeroplane has to have a large, level field in which to light. A bird can light on a rock or on a tree, but an aeroplane that tried this would be wrecked.

By and by we reach a point beyond which the steamer cannot go. The water has become too swift and shallow for the boat. Now we leave it and take the cars. The engine pulls the train through a pretty valley for many miles. The soil is so rich that there are many people living here. There is much work for the railroad carrying crops to market.

At last the mountains come in sight. The land becomes hilly and the train moves slowly. The engine has to work very hard. What a noise it makes as the train winds through the hills like a great snake!

The valley soon narrows and comes to an end. The hills have become so high and steep that we now call them mountains. We leave the cars wondering what we shall ride in next, for we have still a long distance to go. Looking about, we see an automobile waiting for us. Soon we are away like the wind over a hard smooth road. This road winds through the



Courtesy of the Seattle Chamber of Commerce

ONE OF THE BOATS USED BY THE UNITED STATES SHIPPING BOARD FOR ITS PASSENGER AND EXPRESS SERVICE BETWEEN SEATTLE AND THE ORIENT

mountains on an even grade like that of the railroad, only that it is much steeper. The railroad engine could not pull a train up such a grade.

Now the automobile road comes to an end. Here we find a light spring wagon to which a span of strong mules is hitched. If we had visited the mountains a few years ago we would not have had the automobile ride. We would have had a stage-coach in its place. Stage-coaches, with their six or eight horses, used to dash around curves of the mountain at break-neck speed. How exciting a ride in one would



TOURISTS ON TRAIL AT ALTYN LAKE, ON PIEGAN PASS TRAIL
GOULD MOUNTAIN

be! There stands an old stage, but it is no longer used. All we can do is to climb up on the driver's seat and pretend we are having a ride.

Our mules are slow but strong. They pull us up the steep and rocky road more safely than the automobile would. We ride along the edge of rocky cañons so deep that we can hardly see their bottoms. Here and there we come to tiny

valleys filled with great pine trees. What a soft fragrant carpet their needles make!

At last we reach the end of the road, but the mine we are going to visit is still far above us. Now we shall surely have to walk the rest of the distance. But no, yonder there are some horses saddled for us to ride. A string of donkeys and mules is waiting for a load of boxes and bales. These contain supplies for the miners.

Now we are off again through the mountain air. We go very slowly. The animals pick their way carefully among the rocks. We now see why the railroad did not go any farther. We now see why the automobile could not take us to the mines.

Hungry and tired we at last reach the end of our journey. Here is a little village inhabited by miners and their families. There is a store, a post-office and a school. We are far away from and far above the great city. We are far above where anyone can carry on farming. The only occupation here is mining. But the air is so pleasant, the water so pure and cold, and the mountains so interesting we would like to stay here always.

But the mines are not at the top of the



THIS IS ONE WAY OF TRAVELING IN CHINA

mountain. To reach the highest point we shall have to climb the rest of the way on foot. What a wonderful view over the whole country we get from the top! We are almost as high as an aeroplane can go. We can see as far as we could if we were in one, and we feel much safer upon solid ground.

What an interesting time we have had! In this one journey we have traveled in many different ways. We have seen how our grandfathers used to travel. We have seen how people travel now.



THESE ARE PEOPLE IN EGYPT

How would you like to go to market with this sort of a carriage?

QUESTIONS

How do people travel where there are no roads?

Describe the different kinds of animals that are used for riding.

Describe the different kinds of ways by which boats are made to go.

Why have we given up using stage coaches drawn by horses?

Where are horses still used to pull loads?

Why are there more railroads in the valleys than in the mountains?

Tell how roads are built in rough country.

How do we get past mountains that lie in our path?

What are the different ways by which automobiles are made to go?

Where does the gasoline come from that is used in our automobiles?

Describe the different ways by which we travel through the air.

How does a balloon differ from an aeroplane?

In what way do you like to travel best?



This Indian woman is weaving a rug by hand. Why are our rugs mostly made by machinery?

OCCUPATIONS

We call those people savages who lead a rude, wild life. The Indian is a savage. His life is simple. He does not trade much and has few occupations. Those things which he cannot get or make himself, he goes without.

The Indian hunts his own food. He makes his clothing from the skins of animals which he has killed. He knows how to build a rough shelter to protect his family from the storm.

Savages live very much as animals do. When food is plentiful they eat all they can. When food is scarce they go hungry. They do not work any more than is necessary.

Savages do not store up food as we do. They have very few different occupations. They trade but little with each other.

When people become civilized they find that they need many more things than they did before. There are so many different things to be done that one man cannot learn to do them all well. The father cannot find time to raise food for his family, build their home, and make their clothes. Because of this the work that has to be done in a country is divided up among different men. Each man picks out the thing that he likes to do the best and spends all his time doing that thing.

One man likes to use tools and work with wood. He becomes a carpenter and spends his time building houses for people who are doing other things.

Another man likes to work in the ground. He spends all his time raising vegetables. He learns what plants will grow best where he lives and just how to take care of them. You can easily understand that if he had to spend much of his time making clothes he would not be as

good a gardener. Another man who has a taste for trading takes the vegetables and carries them from house to house, selling what is needed in each place. He learns what people want and how to get it for them.

Some men are fond of animals. They live upon a farm or ranch and raise horses, cattle and sheep. These men do not have time to raise grain and have it made into flour. They get flour from a man who makes that his business.

The tailor knows how to make clothes. He depends upon other men for all the different things which he needs to eat, as well as those which will make his home beautiful.

There are many trades and occupations. It would take a long time to name them all. Each man learns to do one thing. He can make his living if he does that thing well. You see now how it is that work is divided. Each of us depends upon others for the most of the things which we want.

You will be successful if you learn to do one kind of work. You will be more successful if you do that work better than any one else can. Have you heard the old saying, "Jack of all trades and master of none"? What does that mean?



WEIGHING COTTON

QUESTIONS

What do we mean by a savage? Who are the Indians?

Do you know what kind of homes they have?

How are we different from savages?

What kinds of work do you think the Indian does?

Mention some of the important trades or occupations.

What kind of work do you like best?

What are the occupations of people near where you live?

Why is it better to know one thing well?

What kinds of work are carried on in cities?

What work do most people in the country carry on?

What kind of work is done in the mountains?

What work do sailors do?

TRADE AND COMMERCE

We have learned that the savage depends upon himself for what he needs. He is easily satisfied.

Would you be happy to change places with an Indian boy and live as he does? You would have only those things to eat which your father could get with his own hands. You would have very few playthings. Can you tell us what kinds of food would be left in your home if some one should take away everything that was not raised near by?

If all the pretty and useful things which were brought from another place or country should be taken away from your home, would it not be bare and lonely?

It is trade and commerce which makes it possible for us to have so many things. If you should travel over the world you would find a different climate. Because of these things you would see many fruits that you do not have at home. You would see people dressing in strange ways and making strange things.

A long time ago all people were wild and savage like the Indians. They did not travel farther than was necessary to get something to eat. Those living on one side of the ocean did not know that on the other side there were people who had many things that were very pretty and useful.

As people slowly became civilized they traveled farther. They crossed the high mountains and the broad oceans. Then those living in different parts of the world began to learn about each other, and how much it would be to their advantage to trade and make exchange.

In warm countries they raised more rice and oranges than were needed at home. Some of these things were exchanged for apples and grain from the cooler countries.

In one country they raised silkworms and made beautiful clothes. In another country were many sheep, and there woolen clothes were used. In still another region they raised cotton.

As people became acquainted with their neighbors they began to exchange those things of which they had an abundance for others which they did not have. In this manner trade and commerce began.

Now a great many people spend all their

time carrying goods from one part of the earth to another. They bring us many things which we enjoy greatly. They carry to other people beyond the ocean the fruit which we raise and the things which we make.

Railroad trains and steamers go all over the world. The people in the farthest islands are becoming acquainted with us. They want our clothes and machines. We want the pretty things they make or the fruit which they raise.

QUESTIONS

What is trade or commerce?

What is made near your home and shipped away?

What does the farmer raise near your home?

What do you eat that is brought from across the ocean?

What things in your home came from another country?

What fruits are brought from the South?

What do we ship to the people in Alaska? What do they raise in Alaska?

What is the chief occupation in Alaska?

What do we drink that comes from the East?

Could you live upon what is raised near your home? Mention the important things.

What are people called who buy and sell?

How are goods carried from one country to another?



AN INDIAN FISH TRAP

HUNTING AND FISHING

A long time ago people lived mostly by hunting and fishing. Every man had his bow and arrows and when he became hungry killed what animals he needed for food. He caught fish by means of traps made of sticks woven together. These he placed in a stream where there was a rapid or waterfall.

When people became civilized they did not depend so much upon hunting and fishing for

their food. They tamed some of the wild animals and raised large herds and flocks. They also discovered that many wild plants could be made to furnish food when they were cultivated.

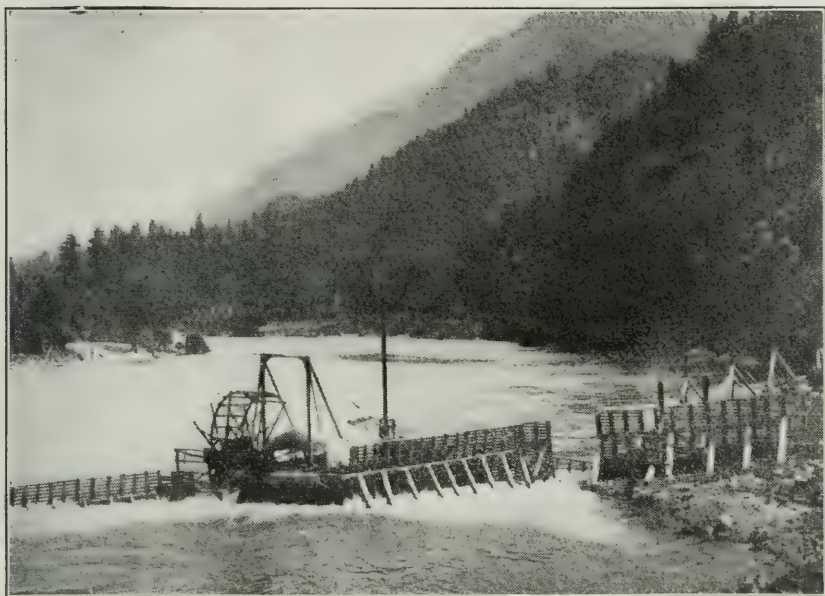
We have much better weapons for killing wild animals than our grandfathers had a long time ago. Our guns have destroyed the animals so rapidly that in many places very few are left.

We have also invented great nets and sharp hooks to catch fish, so that in many streams the fish are nearly gone. The ocean, however, is so large that we can never catch all the fish out of it.

Is it not wrong to kill animals and birds for sport? Our grandfathers killed them only when they were hungry. Our world would be rather lonely without the pretty birds and graceful animals. We must protect them instead of wastefully destroying them.

The most of the meat which is now used for food is supplied by animals that have been tamed. Food is only one of the many useful things which the herds of cattle and sheep afford us.

Streams where much fishing is done are now supplied with young fish from places called hatcheries. In such places fish are collected and



A FISH-WHEEL ON THE COLUMBIA RIVER

their spawn or eggs saved. When the eggs are hatched the little fish are sent to those streams where they are needed.

The most of the men whose occupation is fishing live by the large lakes or along the ocean. They spent their whole lives catching fish for the market. A part of the fish which they catch is sold fresh. Some kinds of fish are canned. Others are salted and dried.

The life of the fisherman is a hard one. He has to be out in the rain and storm. He often spends days without catching anything.

The whale and seal are hunted in the far north where the most of these animals make their home. The life of the whaler is more dangerous than that of the fisherman. He has to stay in the Arctic ocean and among the icebergs for many months. Many whaling ships have been caught and crushed in the ice.

We can no longer depend upon wild animals for our food, as people did long ago. There are more people in the world now and many of the animals which were abundant once have all been killed.

Some are found now in only a few places. These will soon be gone if we do not take better care of them.

Birds, animals and fish furnish us many things that we need. We cannot do without them. They also help make our world a pleasant place in which to live.

QUESTIONS

Can you mention some of the animals that our grandfathers used to hunt?

Mention the most important animals that have been tamed?

What ones supply us with meat?

What wild birds have been tamed?

What do these birds now supply us with?

Mention some of the things obtained from the whale.



Courtesy Boston and Maine R. R.

HAYING WITH OXEN IN NEW ENGLAND



Courtesy of the International Harvester Company of America

A TRACTOR OPERATING A HUSKER AND SHREDDER

FARMING

Who is it that raises our corn and wheat?
Who is it that comes to town with fat chickens
and bright red apples? We call him the farmer,
and his work farming.

We think there is no nicer place than a
pretty farm to spend a part of the summer.

There we can get fresh butter and milk and pure water. We have such happy times romping in the fields and woods. There are no narrow streets and tall buildings to shut out the sun. The work of the farmer is hard, but he has the bright, happy world about him.

The farmer boy often thinks the farm is not a pleasant place. He wants to go to the city. He forgets how much he would lose if he left the farm. He has around him the birds and animals, and green trees. He can go swimming and fishing. In the city he would be like a bird in a cage.

There are many different kinds of farming. In one place the soil and climate make fine apples. There the country is dotted with orchards.

In another place where the land is moist there are great meadows. There upon the meadows are thousands of cattle feeding. This is where butter and cheese are made.

In the hot valleys where the summers are long and dry there are miles and miles of vineyards. Here they make raisins by drying the grapes in the sun.

Upon the plains and prairies we find wheat fields stretching as far as the eye can reach. How pretty the grain looks, when nearly ripe,



IRRIGATING AN ORANGE GROVE, CALIFORNIA

waving in the afternoon breeze. From these fields the grain, after being ground into flour, is shipped to all parts of the world.

Near the cities there are extensive gardens

where many people are employed. Each morning some one comes to our doors bringing berries and vegetables fresh from these gardens.

The best farms are where the soil is deep and there is plenty of water. In most places it rains enough so that the farmer can raise all he wishes. In other places ditches many miles long are dug. Through these water is led from some river, and then allowed to flow over the land. This is called irrigation.

In selecting a farm we think that the kind of soil is important. Water is even more important. Without water the richest soil would be only a desert.

QUESTIONS

What are the advantages of living on a farm?

Where would you look for a farm, in the valley or on the mountain?

Why?

Mention some of the grains which a farmer raises.

What is necessary to make a good farm?

What do the farmers raise near your home?

Of what use are meadows?

What kinds of work does the farmer boy have to do?

How do farmers raise fruits and vegetables where it does not rain?

Would you rather live on a farm or in the city? Why?



CATTLE ENTERING FOREST AT DRIFT-GATES BELOW KENDALL RANGER STATION
FOREST OFFICERS COUNTING THEM IN. BRIDGER NATIONAL FOREST, WYO.

STOCK RAISING

In the eastern part of our country the farms are small. Each farmer raises a few horses, cattle, and perhaps sheep.

In the West the farms or ranches are often very large. They reach for miles and miles across the plains and over the mountains. Upon these large ranches they often raise nothing but stock.

The farmer in the East keeps his cattle in a

little field called a pasture. He may drive them to the barnyard every night.

The land over which the cattle wander upon the great stock ranches is called the range. The men who look after the cattle are called cow-boys or vaqueros. Few people live upon these large ranches and the cattle become almost as wild as deer.

Once a year the cattle are rounded up. The cow-boys ride over the ranch on horseback and gather all the cattle in a great bunch. It often takes them many days to do this.

The steers that are full grown are separated in order to be driven away to market. The little calves are marked with a hot iron so that it may be known to whom they belong. This is called branding. What a bellowing the calves and their mothers make! The cattle are afraid of men on horseback, but it is not safe to go among them on foot.

In some parts of the West there are bands of wild horses. They have escaped from ranches and after many years become very wild.

How full of life they appear as they dash across the plains! These wild horses are often called mustangs. They are so wild that it is difficult to break them to ride.



SCENE ON A SHEEP RANCH

Compare with the picture of cattle. Which looks like a desert? Why could one have a sheep ranch where it is too dry for cattle?

Sheep and goats are not allowed to wander alone as the cattle do. They would be destroyed by the coyotes and mountain lions.

The sheep are divided up so that there are one thousand to three thousand in each band. A man called a herder has charge of each band. With his shepherd dogs, who are very intelligent and trained to do whatever is needed, the herder keeps the sheep together. At night they are driven into a corral where they will be safe from the wild animals.

Wherever you find a band of sheep in the mountains of the West you are sure to see a herder watching them. There he goes as the sheep feed along. He has a canteen upon his shoulder for carrying water, and a donkey by his side. The donkey carries his food and blankets.

In this way the man follows the sheep from place to place through the summer. The life of a sheep herder is a very lonely one.

Once or twice a year the sheep are washed and sheared. The wool is packed in bales and shipped to market.

QUESTIONS

How do the vaqueros catch the wild horses and cattle?

Why are the cattle so wild upon the large ranches?

Would our milk cows become wild if they were turned loose in the mountains?

What uses are made of the different parts of the sheep?

Why are not sheep allowed to run loose?

Of what use are goats?

Have you ever seen a band of sheep? How do the herders drive them?

Why do they brand the calves?

In what different ways is meat preserved?

What names are given to the flesh of the pig?

Do you know what the food of the pig is?



Courtesy of the Seattle Chamber of Commerce

SCENE ON MOUNT RAINIER IN RAINIER NATIONAL PARK



STEAM LOG HAULER. TAKES THE PLACE OF TWELVE TEAMSTERS AND FORTY-EIGHT HORSES, LITTLE FALLS, MINN.

LUMBERING

Do you know where the lumber came from which was used in making your house? The boards and beams have an interesting story to tell.

They were once a part of some tall pine trees in a dense forest. The forest covered many miles of the steep mountain sides.

For many years the forest stood there. Each year the trees grew a little larger and taller. Perhaps you have seen the rings in a saw log. These show the number of years that the tree has been growing. One ring represents a year.

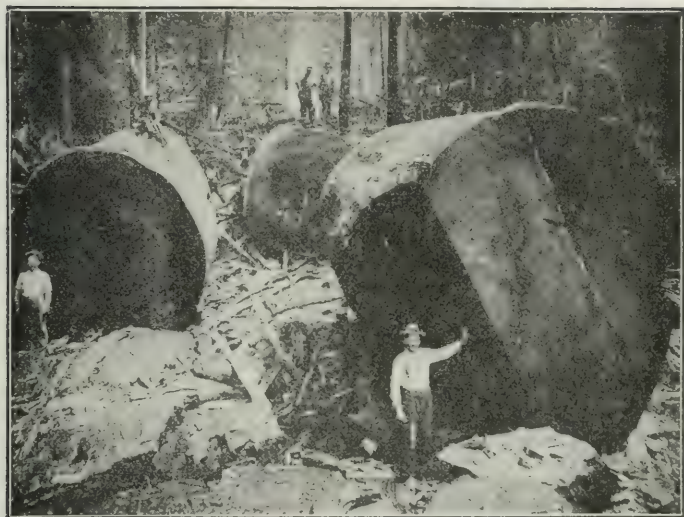
The older trees of the forest partly decayed, and the winter storms threw them to the ground.



Courtesy United States Forest Service

BRINGING IN A TRAIN LOAD OF FIRE-KILLED WHITE PINE, ST. JOE
NATIONAL FOREST, IDAHO

This scene shows the great devastation caused by forest fires.



CUTTING REDWOOD TREES IN CALIFORNIA

Each year some of the nuts in the pine cones escaped the eyes of the watchful squirrels. Some of these nuts became covered in the earth and sprouted, soon forming baby pines. The little pines slowly grew up and took the places of the older trees.

At last some men found the forest. The trees suited them and they sent other men with saws and axes to cut the trees down. After being cut down they were sawed into logs. When the snow came oxen were hitched to great sleds, and the logs were hauled to the bank of the nearest river.



READY TO START TO THE RAILROAD WITH A LOAD OF LOGS, NATIONAL FOREST, ARIZONA

In the spring, when the snow melted and the river rose, the logs were rolled into the water. Away they went in great numbers, almost hiding the river. The logs floated down the river for miles and at last stopped at a big dam before a sawmill.

Then one by one the logs were pulled out of the water and run into the mill. How interesting the machinery is! It picks up each log as easily as you would a little stick. Very soon the buzzing saws have changed the rough logs to smooth, clean boards.

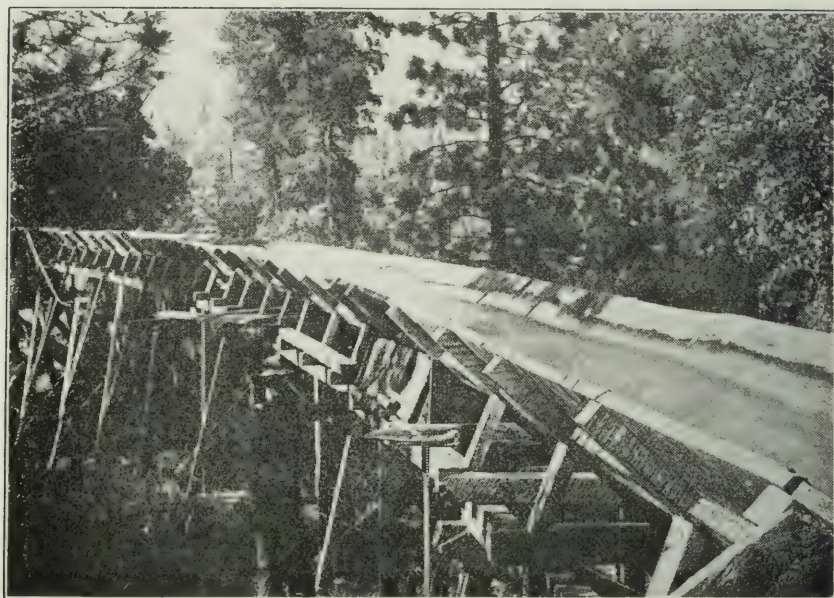
Railroads are now built into the forests and



BIG LOGS IN ANACORTES—WASHINGTON MILL BOOM

the logs are hauled out on the cars. The sawmills are placed where the lumber can be shipped to market easily. They are sometimes upon a bay by the ocean. Sometimes they are upon a river if the river is large enough for boats to come up to the mill.

How do you suppose the lumber is shipped to market from the sawmills high up in the mountains? The lumbermen build what is called a flume. This is a V-shaped trough made of planks. The flume is extended around the mountain sides and along the cañons for many



Sometimes lumber is floated from the mills down the mountain sides to the valleys in a wooden flume. In such places it is difficult to build roads or railroads.

miles. It is made to slope enough so that the water will run through it swiftly. When everything is ready water is turned into the flume. The lumber is thrown into the water, and away it is carried, mile after mile, until it reaches the end of the flume. There it is placed upon boats or cars.

It takes so many, many years for a little pine to become a great tree, that if we are not careful of the forests they will soon be gone.



LUMBER CAMP IN OPEN WOODS, FLAGSTAFF, ARIZONA

We should guard our forests well, and set out young trees as fast as we cut the old ones down.

QUESTIONS

How does wood look when it is decaying?

Describe the way in which the cones hold the little nuts.

Why should we be careful of the forests?

How many years do you suppose it takes a large tree to grow?

Mention all the different kinds of trees used for lumber.

What is the kind most commonly used?

Where did the lumber in your house come from?

THE COUNTRY STORE

Perhaps you live in the country. If you do, you can tell us something about the store near by.

The store may be the center of the little world in which you live. There your father goes to buy the sugar, flour and many other things which you need. There, in most country villages, the post-office is located.

Can you tell why the store was put where it is? Look around carefully and perhaps you can discover the reason. If you learn to understand the little world about your home it will help to make interesting the study of the large world which lies beyond.

We see first that the store is often upon a corner where two roads cross each other. It was placed here so that it could be reached easily by the people living near by.

You would not look for a store where there were no people. People live mostly in valleys where the climate is pleasant and the soil is rich.

If many people come to live in the country

near the store there will be much buying and selling. All of the business cannot be carried on in one store and a little town may grow up.

There will be a post-office in one building, a dry-goods store in another, and a hotel in still another. There will have to be a blacksmith shop and a school house, and perhaps a church. Many people will come to sell what they have raised, and get other things in exchange.

Thus we see that a little store well situated for trade may be the beginning of a town.

There are other places in which a town may be built. A mill is placed near a waterfall in the river. People come to the mill to have their grain made into flour. A post-office is started there and finally a school. If the water power is good the town may at last grow to be a city.

A town may also grow up where there is a mine. Such a town does not depend upon its fertile land or mills to bring people. The mine may be a coal mine. Coal is needed for many purposes and people will go almost anywhere to get it.

You may also find a store upon a bay by the ocean. The bay offers protection to the fishermen. They bring their fish to the store to be shipped away and get their supplies in return.

If the water of the bay is deep large ships will come in to unload and the business carried on will make a town.

You will always find that there is a reason for the store or town being placed where it is. This is either because of fertile lands near by, or because of water power, or mining, or easy communication with the country around, or of trade with other parts of the world.

QUESTIONS

Is your house near a store? Why was the store placed where it is?

What business is carried on in the store?

Mention some of the things which the farmers bring to the store to sell.

What do the farmers buy at the store?

Why is a mill often placed by a waterfall?

Why do you sometimes find a store upon a river or bay?

Would you expect to find a store far from where people live?

Where do you find the greater number of people, in the valleys or upon the mountains?

Mention some of the different occupations in a town



VIEW OF INDUSTRIAL BRIDGEPORT (CONNECTICUT) FROM THE AIR

SOMETHING ABOUT A CITY

A city is a collection of many people and houses. Why do so many people live in one place? What can all of them find to do?

We have already learned that towns grow up where there is opportunity to trade. The town may be found in the valley, by the river, or upon the ocean shore.

The town will grow and at last become a city if it is situated where manufacturing can be carried on, and goods received and shipped far over the earth,

We will suppose that there was a little town

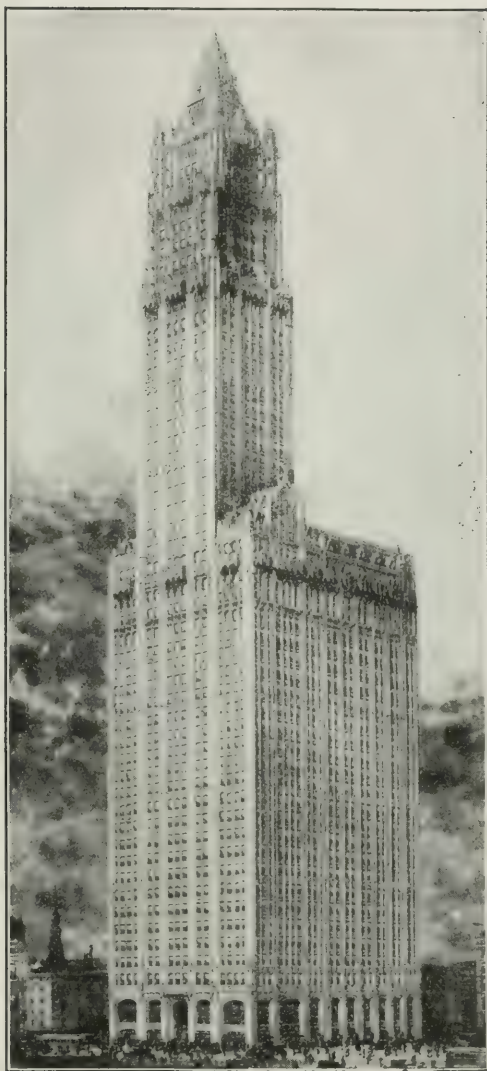
in a rich valley near the mouth of a large river. Vessels from across the ocean came into the harbor and unloaded their cargoes. Steamers were made to carry freight up and down the river, and railroads were built through the valleys.

The farmers sent their grain, fruit, and cattle to the town, because they could do so easily. From the town the steamers could carry these things to all parts of the earth.

The town was such a good place for trade and commerce that more and more people came there and found work. Finally manufactories of many kinds were started. Clothing and shoes could be made there cheaply. Mills were erected to grind the grain. Great shops were needed for making machinery. Ships were built to help in carrying goods back and forth.

We see now that there are many kinds of work going on. As people continue to come, the work increases. Our little town has at last become a great city.

What a noise and commotion there is! Railroad trains are going and coming. Boats are sailing in and out of the bay. We can see smoke rising from hundreds of great chimneys. Men making things for the use of people all over the world.



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WOOLWORTH BUILDING, NEW YORK CITY

The land where the city stands has become very valuable. Many of the buildings have been made so high that we are almost afraid that they may tumble over some time.

The streets are crowded with cars and teams, and mingled in all this confusion there are thousands of people. Some are going one way, some another. They all have work of some kind to do.

People will not come and make a city where there are no rich lands, or bays for ships to anchor safely in. Cities grow up where there are the best opportunities to carry on trade and and manufacture goods.

The position of the city is determined by the character of the land, the river, and the sea coast.

QUESTIONS

Tell us some things about any city that you have seen.

Why was the city built where it is?

How are goods sent away from the city, by land, or river, or ocean?

What kinds of work have you seen going on in the city?

Do you think the city is a good place in which to live? If so, why?

How do people travel in a city?

Why are the buildings made so tall?

Of what different materials are the buildings made?



CUTTING SUGAR CANE

THE MAKING OF SUGAR

Where does our sugar come from? Does Nature prepare it for us, or do we have to work hard and long to get it?

The little boy from the South knows something about sugar. He says that it is made



Photo by Barstow. Courtesy U. S. Forest Service

FIRST STEP IN MAKING MAPLE SUGAR—COLLECTING SAP, BURLINGTON, VT.

from the sugar-cane. Another boy, who lives in a northern valley, says that it is made from sugar beets. He has seen the beets growing over hundreds of acres. A third boy, whose home is among the wooded hills of the Northern States, has never seen the sugar-cane. He has helped the men make sugar from the sap of the maple tree. He thinks that maple sugar is better than any of the other kinds of sugar.

Each little boy knew something about sugar, but not all.

Much of the sugar which we use is made

from the juice of the sugar-cane. The growing sugar-cane looks something like stalks of Indian corn. If you could bite a young stalk of sugar-cane you would then understand how sweet its juice is.

The juice is obtained from the cane by pressing it between heavy rollers. The sweet liquid is then purified and evaporated. By this we mean that the water is driven off until there is left only a dark, thick syrup. The sugar crystallizes from the syrup just as salt does from water. Put a little salt in a dish of water. When the water has nearly dried up crystals of salt will commence to form around the edge of the basin. After the sugar has crystallized, the syrup is given another name. It is called molasses.

The sugar is not white at first. It has to go through many processes before it comes out white and granular and ready for use upon our tables.

We have all seen beets growing in the garden and have often eaten them. You would hardly think that they contain so much sugar. Beets grow best in the dark rich soil of the temperate climate.

It is much more difficult to get the sugar

from beets than it is from sugar-cane. The beets after being dug are carried in wagons to the mill or factory. There they are washed and crushed. The juice obtained is treated in many



RECEIVING BEETS AT THE FACTORY

different ways. At last it comes out as white sugar which you can hardly tell from cane sugar.

The children of cold climates are, I am sure, most interested in maple sugar. The sap of many trees is sweet to taste, but that of the maple tree is best of all.

In the spring the trees begin to awake from their winter sleep. The sun warms the air, and the warm air sends the sap up again from the

roots through the trunk and branches. Soon the buds will swell and the leaves will come out.

When the sap first begins to flow up the tree-trunks men go into the woods and bore holes in the trees. Then they drive spouts into the holes. The spouts carry the sap away and let it fall drop by drop into pails which are placed underneath.

When the pails are full they are carried to a great kettle and the sap is emptied into it. A hot fire is kept under the kettle and the sap is boiled down until it forms a thick syrup or molasses.

How nice the syrup tastes when it has become thick. When the syrup has boiled enough it is emptied into small dishes. As soon as it is cold we have our cakes of maple sugar. This sugar is better than candy and more healthful.

QUESTIONS

From what three things is sugar obtained?

What fruits taste sweet? Do these contain sugar?

Is there sugar in honey? Where do the bees get the honey?

What is meant by evaporate? By crystallize?

How is maple sugar made?

Where is sugar-cane grown?



WHAT THE COW FURNISHES US

No other animal is so useful to us as the cow. We ought to be very grateful to our grandfathers who so long ago tamed the wild cattle. If the cattle had not been tamed they would all have been killed. How gentle the cow looks. She is not afraid of us and does not use her horns to hook us.

Let us see what the cow furnishes us. One of the most important things is milk. Milk contains everything which we need to keep us alive and make us grow.

From milk we get butter and cheese. When milk stands for several hours the cream

rises to the top and forms a thin layer over the milk. The cream was at first scattered all through the milk in the form of tiny globules.

The cream is skimmed from the surface of the milk and placed in a churn. There it is tumbled about until the little globules of cream have united to form a solid mass of yellow butter.

Do you know how cheese is made? The milk is first curdled by putting into it some liquid rennet. Rennet is the name given to a preparation made from the inner coating of the calf's stomach. The curd is separated from the watery part of the milk, which is called whey, and then pressed into solid cakes. The curd is then called cheese.

When cattle are killed nearly all of the parts are used for some purpose. We eat the meat and think it very good. A part of the meat is eaten fresh, other parts are either preserved by being placed in salt water, called brine, or dried in the open air.

The skin is tanned and made into leather for our shoes. The hair which is taken off the skin is also saved. It is mixed in the mortar with which our houses are plastered. The hair helps to make the mortar stick upon the walls.

The bones are first burned and then ground to a fine powder. Bones contain substances which plants need for food. Where the soil does not contain enough of these substances the bone dust is scattered over it. Thus the plants are made to grow stronger and larger.

Even the hoofs are saved. They are boiled in water and glue is made from them. The horns are not thrown away, but are made into a number of things among the most important of which are combs.

QUESTIONS

What uses are made of milk?

What other animals beside the cow give milk for our use?

What is curd?

Describe the hoof of a cow.

Tell about some of the different ways by which meat is preserved.

For what is glue used?

Mention some of the different uses of leather.

Why do the cows have horns?



REELING SILK IN JAPAN

THE STORY OF THE SILKWORM

A silkworm is not a real worm, but an insect. True worms remain worms during the whole of their life history. The common earthworm which you see upon the ground after a rain is a real worm.

The life history of an insect is not at all like that of a worm. Each of the eggs of an insect hatches into a little worm-like animal, or caterpillar. After living a number of days the caterpillar changes into a pupa or chrysalis. In this condition it has a hard case and is helpless. Now it undergoes a slow change and after a time emerges as a perfect insect with wings.



JAPANESE GIRLS REELING SILK IN FACTORY

Thus we see that the insect during a part of its life looks like a worm, but during another part like a very different creature.

The hairy little caterpillar which you one day watched crawling over the ground may have been the same insect which, at a later time, as a pretty butterfly, you chased over the meadows.

Have you not seen the prettily marked cases, from one half to three fourths of an inch long, hanging from a board or limb? If you happen to find one at just the right time you will see the insect break the case and come out a perfect moth or butterfly.

In a short time its wings, which were tightly

folded in the case, will be expanded, and it will fly away through the air.

This butterfly will lay eggs which will, in time, hatch into other caterpillars. Is it not a strange story?

The silkworm came from China. It has been known there for hundreds and perhaps thousands of years. It is now raised in many parts of the world where the weather is not too cold.

The larva or young insect is a little caterpillar. In the earlier part of its life it is hairy, but as it grows it loses its hair and looks more like a worm. This is the reason it is called the silkworm.

The caterpillars, or larvæ, are given all they can eat of the soft green leaves of the mulberry tree. Where silkworms are raised many such trees have to be cultivated to supply the necessary amount of leaves.

When fully grown the caterpillar spins a cocoon of silk about itself, the silk being taken from the lower jaw.

It wraps itself up in about one thousand yards of very fine thread. In this way is formed a whitish or yellowish case which is about one inch in length. In this case, snugly tucked

away, the insect goes to sleep, until after having undergone a small change, he awakes as a moth and bursts the cocoon.

When the cocoons are to be used for their silk, they are not allowed to hatch. At a certain time the insect is killed and the silken threads are unwound. This work is done by the aid of machinery.

You can see that it must take many cocoons to make one yard of silk cloth. The different colors of the silk are given the threads before they are woven into cloth.

QUESTIONS

How does the silkworm differ from a real worm?

Describe the appearance of a caterpillar.

What is the cocoon? What is the chrysalis?

Mention some real worms.

What is meant by larva? By moth?

Mention a number of insects.

Have you ever seen a butterfly emerge from the chrysalis?

What was it before it became enclosed in the chrysalis?

Mention the uses of the mulberry tree. Does it bear any fruit?

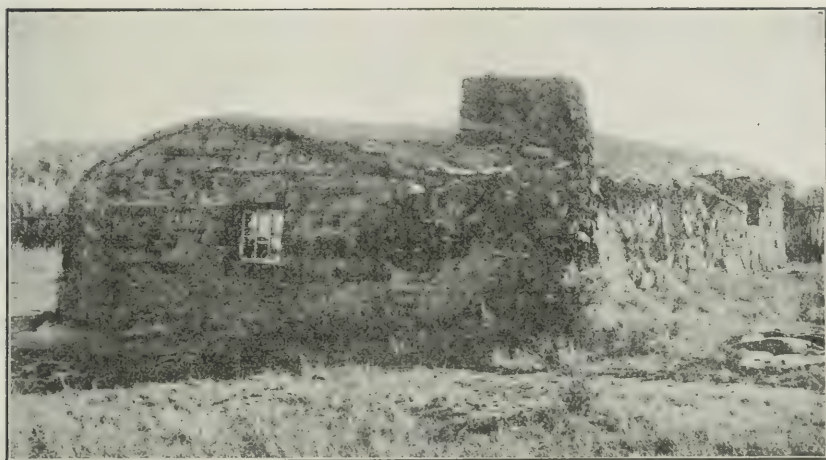
What is the fruit like?

Do all insects fly?

Does the silkworm have wings after emerging from the cocoon?

Where does the most of our silk come from?

Where was silk first made?



SOD CABIN

THE HOME IN THE DESERT

My home is in a desert. Did you ever see a desert? I will tell you about it.

The desert is a great valley where it seldom rains. The ground is almost level as far as you can see. Mountains lie all around the valley, but they are ever so far away.

There is little soil in the desert. For miles and miles there are yellow sand and gravel.

In the middle of the desert where the ground is lowest the sand is covered by something white. What can this white substance be?

It is not snow, for it is too warm here. If you will taste a little of it you will find that it is soda. Perhaps your mother has used some of the soda from this desert in making bread.

Father helps gather the soda. This is the reason we live in the desert. Father says there was once a time when it rained here. Then there was a lake where the bed of soda is now. The soda was dissolved in the water just as sugar is dissolved in your tea. When the water of the lake dried up the soda was left upon the surface of the desert. The water went off in the thirsty air, but the soda, like the salt in the ocean, could not escape in this way.

It is very hot upon the desert. We are sorry to see the sun come up and glad when it goes down. Where do you suppose we get our water? We need a great deal to drink, for the air is so dry. Men have died upon this desert because they could not find water.

Our water comes in an iron pipe. If you will follow the pipe for many miles over the hot sand you will at last come to the mountains. There in a cañon hidden from the hot sun is a little spring of pure water.

How the wind does blow sometimes! The air is then so full of dust that we can hardly

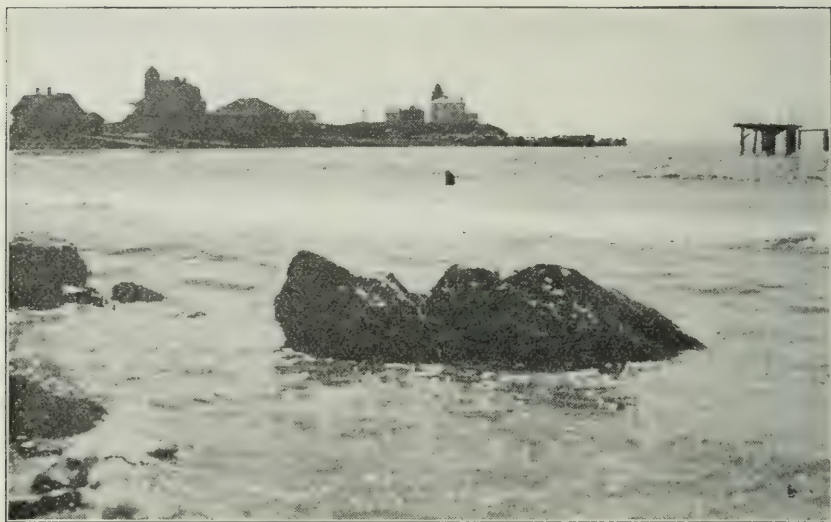
breathe. It is not safe to go far from the house when a dust storm is raging.

It is very lonesome here. There are no trees. There are no flowers and green grass to tell us when spring comes. There is nothing growing in the sand but a few low bushes. These are called greasewood. In some places there are bunches of cactuses. This is a queer plant. It has thick stems and long hooked thorns. We keep as far away from it as we can.

There are no song birds here. The most common bird is the road-runner. He is a strange fellow. He has long legs and tail, and runs swiftly over the desert.

There are only a few animals. Of course we have mice. Besides these, there are the lizards and horned toads. The lizards dart over the sand and are out of sight almost before we can get a look at them. They appear to guide themselves by their long tails. The toads have little horns upon their heads. When it is cold they bury themselves in the sand. The warmer it becomes during the long days the more they seem to like it. They are just the color of the sand.

The rattlesnakes we are afraid of. They are not large, but very quick and poisonous.



THE OCEAN AT WATCH HILL. RHODE ISLAND

THE HOME BY THE OCEAN

Would you like to know about my home by the ocean? We live in a very pleasant place. We never get tired of playing upon the beach and watching ships sail by.

When a ship first comes in sight we can see only the tops of the sails. These grow larger and larger and at last the whole of the boat comes in sight. If we climb to the top of a hill we can see the tops of the boats first because the earth is round. Some of the ships come from the other side of the world, for the

fishermen once took us out to one and the captain let us see the sugar and oranges and bananas which he had brought thousands of miles.

The water in the ocean behaves very strangely. It is always moving up or down. Twice every day it rises and we are sometimes afraid that it will flow over the land where our home is. But it always stops and then goes down again.

This rising and falling of the water the fishermen call the tide. When the tide is out it is great fun to climb over the rocks and see what the water has left. There are little ponds where we find strange-looking fish, bright-colored sea-weeds, shells, star-fish, and many other things.

In some places there are great stretches of mud flats when the tide is out. There we find different kinds of clams buried in the mud.

When the wind blows hard there are great waves. They break with such force upon the shore that even the hard rocks are worn away. They are slowly tearing down the bank in front of our home. Once a ship was blown ashore and the waves soon broke it to pieces.

There are many pretty pebbles upon the beach. They have been worn smooth by the waves which are always throwing them about.

We wonder if there are hills and valleys beneath the ocean as there are on the land. The fishermen say that in most places the bottom of the ocean is smooth. There are no brooks and rivers in the ocean to dig out valleys as there are on the land.



A FISHERMAN'S HOME ON THE COAST OF MAINE

We have learned that the shore of the ocean has not always been where it is now. At the foot of the hill back of our home there is a layer of shells like those in the ocean, and a whole field of smooth pebbles.

We love to study geography because we have discovered so many things along the ocean that we have read about.



PICKING ORANGES

HOMES AND WORK IN THE SUNNY SOUTH

In different parts of our country people have different kinds of homes and do different kinds of work. Our country is so large it would take us a long time to go all over it and see all the homes. Can we learn something about them without going so far? Let us stop a moment and think.

Do the children who live among the rocky hills have the same kind of a home as those who

live in the valleys? Do the fathers carry on the same kind of work? Do the children who live by the ocean eat the same kind of food as those who live in the deep forests? Do children who live in the desert have homes built of the same kind of materials as those who live where it rains a great deal? Do the children of the cold North live in the same way as those in the warm, sunny South? Do their fathers engage in the same kind of work? Do they wear the same kind of clothes? Do they eat the same kind of food?

What interesting questions these are! I am sure you can answer them from what you have seen in your little journeys around your own home. Tell what your home is made of, and what kind of work your father does. Tell what kinds of trees and plants grow there. How unlike will be the stories of the children in different parts of our country!

Now let us take an imaginary journey to the South. We call this land the warm, sunny South. But are we sure that all parts of the South are warm? Are we sure that all are sunny? Think of what we read in an earlier chapter about the different things we saw in climbing a high mountain. Think of the story about where the rains come from.



Courtesy New Orleans Chamber of Commerce

UNLOADING SCENE AT NEW ORLEANS, THE WORLD'S GREATEST BANANA PORT

In our southern land the sun is almost overhead in the summer. It shines down very hot upon the lowlands. In some parts the winds bring many clouds and much rain. In other parts the winds are dry and there are few clouds.

Suppose, now, that there is a high mountain in this southern land, and that you have climbed to the top of it. What sort of a climate would you find upon its high slopes? If there are people living there, what sort of work would they do for a living?

Let us think now of that part of our own southern land where there are no mountains.



Courtesy New Orleans Chamber of Commerce

Will one picture in our minds do, or shall we have to form many pictures in order to see it all?

Our rice comes from the South. Our sugar comes from the South. Cotton comes from the South. Oranges come from the South. Winter vegetables come from the South. Coconuts come from the South. Dates come from the South. Bananas and pineapples come from the South.

All of these products need a hot climate. Some grow in summer and do not mind if there is a little frost in winter. Others cannot grow



Courtesy New Orleans Chamber of Commerce

PICKING SWEET PEPPERS AT AVERY ISLAND, LOUISIANA, NEAR NEW ORLEANS

where there is any frost at all. Can you tell which ones cannot bear frost? Each of the things mentioned needs a climate and soil different from the others. Because of this the South must be a very large land. The children of one part must have homes unlike the children of other parts. Their fathers must be engaged in growing many kinds of fruits, grains and vegetables.

Let us visit first a part of the South where rice is grown. In what sort of a place does the rice farmer make his home? From a little distance a field of rice looks much like a field of


oats. But what do you see the rice plants growing in? It must be water. It is necessary to plant rice where the land is so low that it can be flooded with water while it is growing.

If we traveled over the rice country we would see the fields surrounded by low banks of earth. The water is turned into each field after the rice is planted. The earth holds the water from running away. When the rice is nearly ripe the water is drawn off to permit harvesting.

The homes of rice farmers must be upon low land. They must be near some stream from which water can be taken to keep the fields flooded while the rice is growing. In our Southern States it rains a great deal and there are many streams near at hand. In California there is no summer rain. There the fields have to be supplied by water brought in canals. Sometimes the water has to be brought many miles at great cost.

Let us now visit the land of the sugar-cane planter. From a distance a field of sugar-cane looks much like a field of corn. However, the sugar-cane grows larger and the stalks are very tough! How sweet they are! How the children like to have a piece of sugar-cane to chew. In some countries pieces of sugar-cane are sold in

the markets just as sticks of candy are sold in our stores. But the sugar in the sugar-cane is much more healthful than the sugar in our candy.

 Sugar-cane must have very rich soil. It must have hot weather in which to grow. Here upon a great plain is a field of sugar-cane. Through the middle of the plain a great river runs very slowly. The river made this plain in the same way that the little streams which we have already studied made its little delta. The plain is a great delta. Can you guess the name of the river? The river brought down tiny bits of mud year by year and left them spread over the plain to form the rich soil. The summers upon this plain are long and hot. There is plenty of rain. The soil is rich. These are the three things that make sugar-cane grow well.

The home of the sugar planter is on the low land of this great delta. But the land must be drier than where the rice farmer lives. Tell about some of the other plants useful to us that ought to grow well in the land of sugar-cane.

Because the most of our South land is better suited to cotton we grow a great deal more of it than we do of sugar-cane. We grow so much of it that this land is sometimes called the Land



IN THE COTTON FIELDS OF THE SUNNY SOUTH

of Cotton. Cotton does best where the summers are long and hot. But cotton does not need as rich delta soil or as much water as sugar-cane.

The cotton belt is a vast plain. We would come to the low wet home of the rice farmer upon the lower part of this plain if we traveled far enough. Beyond the rice farmer we would come to the great ocean. If we traveled toward the higher part of the plain we would come to low rolling hills. These hills are also dotted with cotton fields. If we followed the hills far enough we would come to mountains where plants grow that like colder weather.

Would you not like to live among these low hills and raise cotton? Your home would be pleasanter than the home of the rice farmer or that of the sugar planter. Can you tell the different ways a home upon high land is pleasanter than one upon the low lands?

The Land of Cotton is a hot land, but it has no orange groves. Why is this? I will tell you why. Cotton plants, sugar-cane plants and rice plants do their growing in the summer. They care as little about the winter frost as do the vegetables in your garden. The orange tree grows through the whole year and through many years. It ripens its fruit in the winter. Thus



Courtesy New Orleans Chamber of Commerce

WEIGHING COTTON—COTTON PICKING SCENE NEAR NEW ORLEANS

you can see that the orange thrives only where there is little or no frost in the winter. The land of rice, sugar-cane and cotton which we have visited sometimes has cold storms in winter. When these storms sweep down from the north they kill such tender trees as the orange.

We shall have to go still farther south to find the orange groves where your winter oranges come from. We shall have to go to the far southwest where California lies, or to the far southeast where Florida lies, to find the home of the orange.

I am sure you have all heard of these warm

sunny lands where all sorts of tender fruits grow that do not like the frost. If you have not seen these lands you can surely find someone who has seen them to tell you all about them.

The orange must have hot weather. The tree does not care whether it rains or not if its roots can reach water. It must have rich soil and plenty of water to make the fruit large and juicy. The orange tree does not do so well upon low land where rice and sugar-cane thrive. It must have well-drained soil. Do you think a home in an orange grove must be a pleasant one? The orange blossoms are so fragrant. The fruit is so good when freshly picked from the trees.

Let us now turn to the coconut and date. Both of these fruits grow upon palm trees and both come from hot lands. How we enjoy eating dates. They form a very rich food. It takes only a handful of dates to make a fine lunch. The coconut gives us milk and a hard meat. This meat is delicious when grated and used as a seasoning for other foods. But did you ever think how very unlike are the places where these two kinds of fruits grow?

The coconut palm does not care what kind of soil its roots find. A poor sandy soil will



AVENUE OF PALM TREES, RIO JANEIRO

answer very well. The air where the coconut palm grows is warm throughout the whole year. It prefers a place near the ocean where it can get the moist refreshing sea breezes.

Can we find any part of our own country where there are sea breezes and no frost? Let us go to the southern tip of Florida. Here is a land that has the ocean on three sides of it. Here are coconut palms hanging over the sandy beach. This is the sort of place you would have to make your home in if you grew coconuts. Can you tell where the most of our coconuts come from?

How different is the home of the date palm! This tree loves the dry hot air of the desert. Its great leaves must wave in a sunny sky. Its feet or roots must be in the water. Where in our country can we find such a place?

On our journey to the orange groves of California we pass through a great desert. Here Nature made a loose rich soil, but she forgot to leave any water. Men have built canals and brought water from a great river that flows through the desert. After that they went to a far-away desert on the other side of the world, where dates grow that we find in the markets. They brought home sprouts of the date palms. They set them out in the desert where they had brought water. The date sprouts were at home in the soil, hot dry air and water of the desert, and grew rapidly. Now we are picking our own dates. Perhaps you have eaten some of the delicious California dates. By and by we shall grow all the dates we need.

Would you like to live in a grove of date palms? Your home would be different from any you have ever seen. It would be built of adobe bricks. This sort of a home is cool in the hot summer.

You may ask why we do not grow bananas

or pineapples in this hot desert. There is sometimes a little winter frost in the desert. This does not hurt the date palms, but bananas and pineapples do not like even a little taste of winter. Besides they like damp air better than dry air.

We shall have to go back to the southern tip of Florida to find the home of these fruits. Where do the most of our bananas and pineapples come from?

QUESTIONS

Where is your home and of what is it built?

What are the chief occupations where you live?

How do the winters in the South differ from those in the North?

If you live in the South what winter pleasures would you have to do without?

How is rice prepared for eating?

How is sugar made from sugar-cane?

What uses do we make of cotton?

Why is wool used more in the North and cotton in the South?

What different uses do we make of the coconut?

How is it people in the North can have fresh vegetables in the winter?

Tell where you would like best to live.



A PICTURE

WHAT IS A MAP?

We have before us a picture of a rocky coast. The picture shows what we would see if we visited the place. Can you mention the different forms of land and water in the picture?

In the front of the picture there is a high,

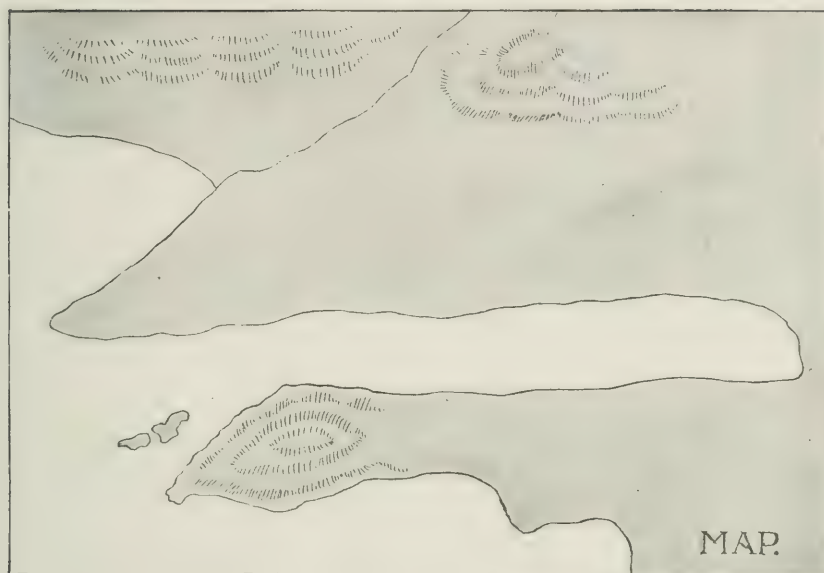
rocky point with trees upon it. Behind the point and partly hidden you can see a deep bay. The ocean waves have torn away the land behind the point and are still making the bay larger.

Upon the farther side of the entrance to the bay is another rocky point. Between the two points there are two low rocky islands over which the waves dash.

In the back part of the picture there are hills. There seems to be an opening between the hills where there must be a valley with a river flowing through it to the ocean.

Our picture is taken from the top of a hill. You could not see so much if you were down near the level of the water. If we were still higher in the air we could see more of the bay and get a glimpse of the river. Such a view we might call a bird's-eye view, because it is what we could see if we were up where the birds go.

If we go up very high in a balloon and look directly down upon the country shown in the picture it would look quite different still. Then if we took a pencil and tried to make a picture of what we saw we should draw the coast line with its bendings in and out, the bays and rocky points, islands, and the river flowing to the ocean. Our picture shows that the different



portions of the land vary in height, but far up in a balloon we could not distinguish the height of things. All that we could make out clearly would be their outlines.

Now the drawing which we make of the different forms of the land and water which we can see looking directly down upon them is called a map. Our drawing or map represents the earth as though it were flat. We cannot tell how high the hills or the cliffs along the ocean are. We can tell, however, that in one place the land is smooth and in another rough.

We can put upon our map then some shading to indicate where the rough, hilly places are.

We could not make a map exactly correct while in a balloon. To make a correct map we would need to take a measuring line and compass, and walk all over the country of which we wanted to make a map. We would measure the position and direction from each other of the points, the islands, the bay and the river.

You cannot make a map as large as the country over which you would walk. What is to be done? You might take one inch upon your ruler and let it represent one hundred feet of distance upon the land. Then if the two points at the entrance of the bay are five hundred feet apart you will lay off five inches upon your paper.

Maps are of much use to us. They represent different portions of the earth's surface. We can look upon a map and tell what there is in a certain place without having to go to that place.

